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LAKE ERIE SURVEILLANCE DATA SUMMARY, 1967-1968

Federal Water Pollution Control Administration
Chicago, Illinois

May 1968

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LAKE ERIE SURVEILLANCE DATA SUMMARY

1967 - 1968

UNITED STATES
DEPARTMENT OF INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
GREAT LAKES REGION
CLEVELAND PROGRAM OFFICE

MAY 1968

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Summary

Although Lake Erie is still an excellent source of municipal raw water, the effects of pollution are becoming ever more discernible. The dissolved solids have increased by nine percent since 1964 with progressively higher concentrations from west to east. Most chemical constituents in both water and sediment have increased during the same period.

High populations of phytoplankton were noted with diatoms the overall dominant type in spring, fall, and winter, and green and blue-green in summer depending on the basin. Bloom conditions were not noted during the 1967-68 sampling period. As in 1964, the pollution-sensitive scud was all but missing in all samples. The pollution-sensitive types, such as sludgeworms and bloodworms, were in profusion.

The 1967-68 program was the first published study of the chemical, biological, and microbiological conditions under ice cover. The limited winter program revealed higher bacterial densities in western basin bottom waters as opposed to the non-winter 1963-64 findings where the highest densities were found in the surface waters.

Introduction

The following report is the first of an anticipated annual series to be prepared by the Cleveland Program Office of the Federal Water Pollution Control Administration, Great Lakes Region. All significant data gathered by the Cleveland and Detroit Program Offices in their surveillance monitoring programs on Lake Erie will be included.

The purpose of the reports is to chronicle water quality changes in Lake Erie. It is not the intent to provide detailed interpretive evaluations. However, the compiled data, along with information collected by other agencies, should be useful to those engaged in lake water resources management including pollution control.

All water quality data of a routine nature are to be entered into the STORET data processing system in use by the Federal Water Pollution Control Administration.

Acknowledgments

The first four surveillance cruises conducted by the Cleveland Program Office were made with the United States Coast Guard buoy tender Tupelo. The cooperation of the Coast Guard is gratefully acknowledged and special thanks are given to the captain and crew of the Tupelo in accommodating Cleveland Program Office personnel and equipment. All waters analyzed by the Detroit Program Office were sampled with Federal Water Pollution Control Administration equipment assigned to the Detroit Office.

Program and Methods

The Cleveland Program Office surveillance program on Lake Erie was initiated in response to a recommendation by the state-federal Conference on Pollution in Lake Erie and its Tributaries in August 1965. The Detroit program is the result of an earlier similar conference on the Detroit River and Michigan Waters of Lake Erie in 1963. In order to better describe any changes in the overall quality of Lake Erie, both programs were primarily designed for offshore water quality definition.

The Cleveland program was established to include sample collection at thirty stations along the longitudinal midline of the lake (Figure 1). The plan called for four sampling cruises per year under the conditions of (1) ice cover, (2) spring overturn, (3) maximum temperature stratification and (4) fall overturn. Each station was to be sampled in three areas, at the surface, mid-depth, and bottom. Bottom sediment samples were also to be collected.

In accord with the Cleveland plan, midlake water and sediment were sampled in May, August, and October 1967, and January 1968. The sampling

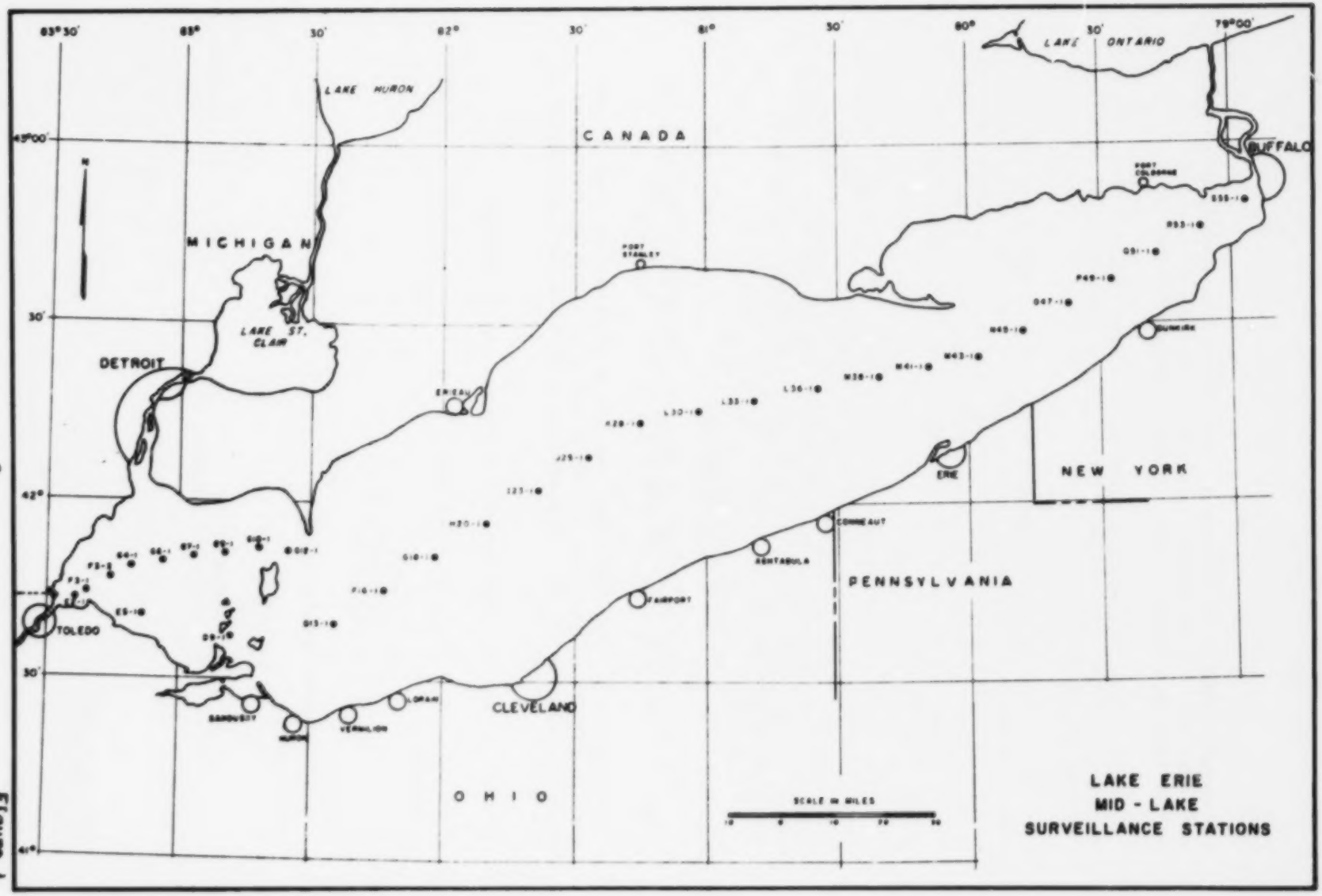
LAKE HURON
CANADA
LAKE ONTARIO
BUFFALO
MICHIGAN
DETROIT
LAKE ST. CLAIR
NEW YORK
ERIE
CONNEAUT
ASHTABULA
PENNSYLVANIA
FAIRPORT
CLEVELAND
VERMILION
TOLEDO
SANDUSKY
OHIO
SCALE IN MILES
LAKE ERIE
MID - LAKE
SURVEILLANCE STATIONS

Figure 1

was accomplished as planned except for the January cruise, which was completed only in the western basin and a portion of the central basin, then terminated because of severe ice conditions.

Only non-winter, western basin surface water samples were collected by the Detroit Program Office. Figure 2 shows the 26 stations included in the Detroit study.

In addition to cruise sampling data, future reports will include data from biweekly raw water sampling at most municipal water intakes along the south shore. The Ohio intake sampling program was initiated in March 1968 in cooperation with the Ohio Department of Health. Similar programs are anticipated with the States of Michigan, Pennsylvania, and New York.

The water quality documentation with which data from this report and future reports should be compared is compiled in the "Lake Erie Environmental Summary, 1963-64", prepared by the Cleveland Program Office, and in the "Report on Pollution of the Detroit River, Michigan Waters of Lake Erie and their Tributaries - Findings", prepared by the Detroit Program Office in 1965.

PARAMETERS

The water quality parameters shown are those which have been considered, up to this time, as most significant in Lake Erie.

Analysis of both lake water and bottom sediments is made, since each is part of a dynamic environment with continuous interchanges occurring between the two. The quality of each can and does affect the quality of the other.

The parameters included in this report are as follows:

Physical water properties

1. Temperature
2. Transparency
3. Turbidity

Water Chemistry

1. Alkalinity
2. pH
3. Conductivity
4. Dissolved solids

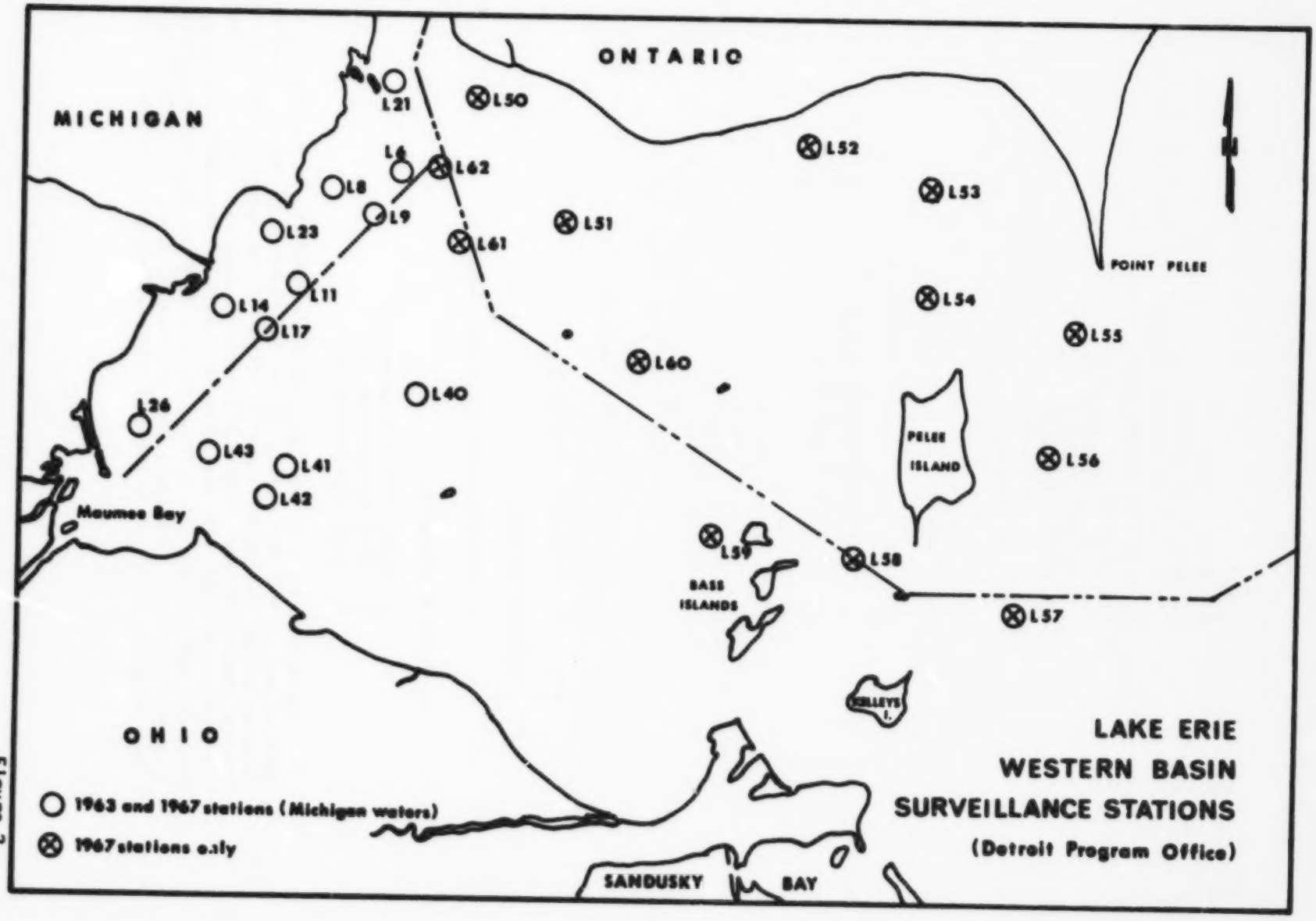
ONTARIO
MICHIGAN
OHIO
L21
L50
L52
L6
L62
L8
L53
L9
L51
L23
L61
POINT PELEE
L11
L14
L54
L17
L55
L60
L40
L26
PELEE ISLAND
L43
L56
L41
L42
Maumee Bay
L59
L58
BASS ISLANDS
L57
KELLEYS I.
1963 and 1967 stations (Michigan waters)
1967 stations only
SANDUSKY BAY
LAKE ERIE
WESTERN BASIN
SURVEILLANCE STATIONS
(Detroit Program Office)

Figure 2

5. Total solids
6. Dissolved oxygen
7. Biochemical oxygen demand
8. Chemical oxygen demand
9. Chlorides
10. Organic nitrogen
11. Ammonia nitrogen
12. Nitrate nitrogen
13. Soluble phosphorus
14. Total phosphorus
15. Silica

Sediment Chemistry

1. pH
2. Eh
3. Biochemical oxygen demand
4. Chemical oxygen demand
5. Volatile solids
6. Total iron
7. Total phosphorus
8. Organic nitrogen
9. Ammonia nitrogen
10. Nitrate nitrogen

Water Biology

1. Plankton types and numbers
2. Organic Seston
3. Chlorophyll *a* and *b*

Sediment Biology

1. Benthic fauna types and numbers

Water Microbiology

1. Total coliform bacteria
2. Total bacteria at 20°C
3. Total bacteria at 35°C

The methods used by the Cleveland Program Office in the measurement of each of the above are given in the "Laboratory Manual, Cleveland Program Office" available from that office of the Federal Water Pollution Control Administration. The significance of each water quality parameter is detailed in "Lake Erie Environmental Summary, 1963-1964" available from the same office, and in "Physical and Chemical Quality Conditions, Lake Michigan Basin" available from the Federal Water Pollution Control Administration, Great Lakes Regional Office, Chicago, Illinois.

List of Abbreviations for Data Compilation

Abbreviations are used in this report for tabulated data according to the following list:

Units

mg/l - milligrams per liter
mg/g - milligrams per gram dry weight
µg/l - micrograms per liter
µmhos/cm - micromhos per cm
MV - millivolts

Water Chemistry

ALK or Alkal - Alkalinity in mg/l $CaCO_3$
BOD_5 - 5-day biochemical oxygen demand in mg/l
CL or Cl - chlorides in mg/l
COD - chemical oxygen demand in mg/l
CON - conductivity in µmhos/cm at 25°C
DO - dissolved oxygen in mg/l
Eh - oxidation-reduction potential in millivolts
FE or Fe - iron in mg/l
N - nitrogen
NH_3-N - ammonia nitrogen in mg/l
NO_3-N - nitrate nitrogen in mg/l
ORG-N - organic nitrogen in mg/l
P - phosphorus
pH - hydrogen ion concentration
SiO_2 - total silica
SO_4 - sulfate in mg/l
SP - soluble phosphorus in mg/l
SS - suspended solids
T - temperature in degrees Centigrade
TDS - total dissolved solids in mg/l
TP - total phosphorus in mg/l
TS - total solids in mg/l
TB - turbidity in mg/l silica

Sediment Chemistry

BOD_5 - 5-day biochemical oxygen demand in mg/g, initial mixing
COD - chemical oxygen demand in mg/g
Eh - oxidation-reduction potential in millivolts
NH_3-N - ammonia nitrogen in mg/g
NO_3-N - nitrate nitrogen in mg/g
ORG-N - organic nitrogen in mg/g
pH - hydrogen ion concentration
T - temperature in degrees Centigrade
TFE - total iron in mg/g
TP - total phosphorus in mg/g
VS or vol. solids - volatile solids in % dry weight

List of Abbreviations for Data Compilation
(concluded)

Biology

Am - Amphipoda in organisms per m^2
Is - Isopoda in organisms per m^2
Pr - Prosobranchia in organisms per m^2
Pu - Pulmonata in organisms per m^2
Hi - Hirudinea in organisms per m^2
Oi - Oligochaeta in organisms per m^2
Ne - Nematoda in organisms per m^2
Tu - Turbellaria in organisms per m^2
Un - Unionidae in organisms per m^2
Sp - Sphaeriidae in organisms per m^2
Ch - Chironomidae in organisms per m^2
Ep - Ephemeroptera in organisms per m^2
Tr - Tricoptera in organisms per m^2
Ot - Other in organisms per m^2
CHLORO - Chlorophyll in mg/m^3
No/ml - number per ml
mg/m^3 - milligrams per cubic meter
Blue-green, green, flagellates, and diatoms given in number of organisms per ml
x - Qualitative only

Microbiology

T.C. - Total coliform in organisms per 100 ml
20° SPC - Total bacterial count at 20°C in organisms per ml
35° SPC - Total bacterial count at 35°C in organisms per ml

Discussion of Analytical Data

The chemical, biological, and microbiological status of Lake Erie in 1967-68 will be compared with that in 1963-64, however, the reader is cautioned to consider the following.

The 1963-64 Michigan waters' stations along with several others in the western basin were the only stations reoccupied in 1967-68. All sampling at these stations was accomplished by the Detroit Program Office. The Cleveland Program Office made no attempt to reoccupy its 1963-64 stations. It was felt that midline sampling was the most efficient way to determine midlake water quality.

In addition, sampling station reproduction in the central and eastern basins can be most difficult. Although radar bearings were made where possible, many stations were located by dead reckoning. It is not inconceivable that the same station may be as much as a mile at variance with that of a former cruise. Station reproduction in the western basin is less a problem since islands and buoys are available for sighting purposes.

WATER CHEMISTRY

Upon reviewing the 1967-68 data (Tables 1 and 2) it can be concluded that with respect to chemical quality Lake Erie still is an excellent source of municipal raw water. However, upon further examination, and in comparison with historical data and the 1963-64 data collected by both the Cleveland and Detroit Program Offices, the relentless increase in most chemical concentrations can be easily detected. The 1963-64 data averages include results from some tributary-affected nearshore stations which are not included in the Cleveland Program Office 1967-68 surveys. Since these data affect the overall lake chemistry averages, the increase in chemical concentrations from 1964 to 1967 may be even more pronounced than indicated.

Cleveland Program Office data (Table 3) indicate that all chemical constituents in the western basin have increased except chloride, silica, and chemical oxygen demand. Table 4 is a comparison of chemical concentrations in the Michigan waters of Lake Erie as sampled and analyzed by the Detroit Program Office in 1967 with that in 1963. These waters, adversely affected by the Detroit River to a great extent, show increases in all chemical concentrations except chloride and organic nitrogen. Table 5 is a comparison of chemical concentrations in the western basin as determined by both Program Offices. Differences are not significant except in nitrogen data, which can be explained by seasonal variations in this parameter.

TABLE I

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3N	NO_3N	ORG N	SP	TP	TB	SIO_2
D09-01	0	5/03/67	2.0	10.2	95	--	11.2	1.3	11.7	8.2		164	167	22	0.09	1.10	0.41	.03	.05	--	0.59
D09-01	0	7/28/67	4.0	23.0	100	300	8.0	1.8	8.7	8.6	--	213	213	19	0.21	0.07	0.37	.06	.06	6	0.35
D09-01	0	10/18/67	2.0	12.7	88	272	10.3	1.7	9.3	7.6	574	169	168	19	0.15	0.09	0.15	.04	.05	10	1.20
D09-01	0																				
D09-01	22	5/03/67		9.5	90	320	10.8	1.6	12.3	8.2		140	139	20	0.05	0.68	0.37	.03	.05	--	1.20
D09-01	32	7/28/67		23.0	100	300	8.0	1.8	9.6	8.6	--	239	223	19	0.26	0.07	0.49	.05	.05	6	0.50
D09-01	23	10/18/67		12.7	87	276	10.3	1.2	6.0	7.9	556	170	153	19	0.02	0.09	0.35	.04	.05	10	0.80
D09-01																					
D09-01	42	5/03/67		9.5	95	310	10.8	1.9	11.4	8.2		162	158	20	0.12	0.74	0.33	.03	.06	--	1.40
D09-01	62	7/28/67		23.0	95	300	8.0	1.8	8.2	8.7	--	204	178	19	0.16	0.07	0.46	.05	.07	7	0.50
D09-01	42	10/18/67		12.7	89	276	10.3	1.7	4.1	7.9	550	169	160	19	0.17	0.09	0.14	.04	.05	9	0.75
D09-01																					
D13-01	0	5/02/67	11.0	7.2	100	330	12.1	0.4	8.5	8.4		--	--	--	0.12	0.22	0.11	.00	.01	--	0.51
D13-01	0	7/28/67	10.0	22.7	90	300	8.8	1.9	10.0	8.5	--	185	184	21	0.13	0.08	0.51	.02	.02	1	0.85
D13-01	0	10/18/67	6.0	13.2	97	276	10.2	1.4	5.7	7.8	532	169	163	21	0.07	0.04	0.33	.04	.04	4	0.20
D13-01	0	1/12/68	7.0	1.6		280	13.2		9.8	8.6	520			19	0.08	0.46	0.26	.02	.02	4	
D13-01	23	5/02/67		7.2	105	330	12.1	0.3	8.4	8.4		144	147	24	0.14	0.02	0.12	.00	.01	--	0.20
D13-01	36	7/28/67		21.0	90	300	8.4	0.9	8.5	8.5	--	227	227	22	0.22	0.08	0.39	.02	.02	0	0.50
D13-01	23	10/18/67		13.2	91	280	10.2	1.7	5.8	7.9	514	164	163	20	0.09	0.03	0.31	.03	.04	4	0.40
D13-01	23	1/12/68		1.5		280	13.0		7.0	8.7	508			19	0.11	0.06	0.27	.04	.04	3	
D13-01	44	5/02/67		7.0	100	330	12.2	0.8	9.4	8.4		224	233	24	0.09	0.02	0.16	.00	.01	--	0.21
D13-01	47	7/28/67		17.3	95	310	7.9	1.4	7.5	8.5	--	175	161	25	0.28	0.10	0.07	.03	.03	1	1.60
D13-01	42	10/18/67		13.1	94	284	10.2	1.6	5.3	7.9	508	169	166	21	0.24	0.03	0.12	.03	.03	4	0.25
D13-01	44	1/12/68		1.2		290	12.7		6.7	8.8	508			19	0.09	0.54	0.29	.03	.04	5	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
E02-01	0	5/04/67	1.5	11.0	105	360		3.2	16.2	9.0		250	259	23	0.14	1.00	1.36	.04	.09	--	1.05
E02-01	0	7/26/67	1.0	23.7	80	670	8.7	3.9	19.6	7.8		213	188	20	0.65	0.01	0.50	.11	.11	11	0.45
E02-01	0	10/16/67	1.0	12.8	97	312	11.0	3.9	9.3	8.4	538	206	176	21	0.41	0.12	0.69	.07	.12		0.50
E02-01	0	1/09/68	0.3	8.8		360	12.7		18.6	8.8	478			19	0.31	2.12	0.71	.12	.14	40	
E02-01	14	5/04/67		10.9	100	360	11.7	3.3	20.0	8.8		243	243	22	0.36	0.93	0.27	.03	.08	--	1.20
E02-01	15	7/26/67		23.7	70	690	8.5	2.5	17.1	7.8		213	200	21	0.04	0.00	1.03	.10	.11		0.55
E02-01	17	10/16/67		12.5	99	312	11.0	3.8	13.0	8.4	508	264	161	21	0.52	0.13	0.58	.07	.16		0.55
E02-01																					
E02-01	26	5/04/67		11.0	105	370	10.9	3.2	20.6	8.7		236	240	21	0.27	0.95	0.49	.01	.08	--	2.50
E02-01	29	7/26/67		23.5	75	680	8.0	3.0	11.2	7.8		277	196	20	0.37	0.00	0.66	.08	.20		0.55
E02-01	29	10/16/67		12.5	108	312	10.2	4.6	24.6	8.2	538	598	176	21	0.76	0.12	0.78	.13	.29		1.95
E02-01	29	1/09/68		8.9		380	12.6			8.9	460			19	0.99	2.20	0.64	.14	.17	50	
E05-01	0	5/04/67	2.0	9.2	95	300	11.0	1.5	15.6	8.4		195	190	18	0.03	0.44	0.43	.01	.06	--	1.65
E05-01	0	7/27/67	4.0	23.0	95	270	7.2	1.9	9.4	8.5		98	88	18	0.36	0.03	0.27	.04	.06	4	1.40
E05-01	0	10/17/67	3.0	13.5	88	278	10.4	1.7	7.0	8.1	508	148	145	21	0.08	0.14	0.54	.05	.06	8	0.75
E05-01	0	1/10/68	5.0	0.6		290	13.0			8.5	490			23	0.12	0.37	0.27	.05	.05	5	
E05-01	12	5/04/67		9.2	95	300	11.1	1.3	12.5	8.6		203	192	19	0.05	0.47	0.49	.02	.06	--	1.30
E05-01	13	7/27/67		23.0	90	275	7.2	1.8	15.7	8.6		208	196	18	0.28	0.00	0.38	.03	.04	4	1.25
E05-01	12	10/17/67		13.4	87	286	10.3	1.7	5.3	7.8	490	157	141	21	0.06	0.14	0.44	.05	.05	9	0.75
E05-01	13	1/10/68		0.6		290	12.6			8.6	490			22	0.13	0.35	0.17	.05	.06	7	
E05-01	22	5/04/67		9.5	90	305	11.1	1.3	13.1	8.2		188	185	24	0.12	0.47	0.35	.02	.05	--	1.15
E05-01	24	7/27/67		23.0	95	275	7.2	1.5	8.5	8.7		204	194	18	0.18	0.04	0.45	.05	.05	3	1.30
E05-01	21	10/17/67		13.4	87	282	10.3	1.5	5.1	7.9	478	157	146	20	0.13	0.12	0.30	.04	.05	9	0.75
E05-01	23	1/10/68		0.3		290	12.4			8.7	490			23	0.12	0.36	0.23	.05	.05	5	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
F03-01	0	5/04/67	2.0	10.0	95	300	11.6	1.9	14.4	8.4		192	190	16	0.14	0.66	0.36	.02	.05	--	1.05
F03-01	0	7/26/67	2.5	23.5	95	290	8.5	2.0	12.0	8.1	--	227	212	18	0.30	0.04	0.40	.06	.06	5	0.65
F03-01	0	10/16/67	2.0	14.0	88	286	11.2	1.9	11.0	8.3	478	163	153	20	0.36	0.09	0.41	.04	.07	10	0.50
F03-01	0	1/09/68	1.5	0.2		310	12.8			9.3	436				0.11	0.66	0.61	.05	.07	15	
F03-01	16	5/04/67		10.2	100	300	11.6	2.0	14.4	8.4		198	184	17	0.11	0.60	0.34	.02	.06	--	0.59
F03-01	17	7/26/67		23.2	90	290	8.3	2.1	13.1	8.1	--	141	116	19	0.46	0.06	0.40	.06	.07	9	0.75
F03-01	17	10/16/67		--	89	282	10.6	2.2	7.1	8.4	460	170	149	19	0.16	0.07	0.37	.05	.07	10	0.40
F03-01	16	1/09/68		0.3		300	12.6			9.4	352			22	0.11	0.64	0.36	.05	.08	15	
F03-01	30	5/04/67		10.0	95	310	11.5	1.7	13.5	8.5		193	198	17	0.07	0.62	0.38	.03	.06	--	1.05
F03-01	32	7/26/67		23.2	90	290	7.7	3.1	10.8	8.1	--	228	200	18	0.21	0.06	0.34	.06	.07	10	0.90
F03-01	29	10/16/67		13.4	89	285	11.0	1.6	8.2	8.3	496	179	158	19	0.11	0.08	0.46	.05	.08	10	0.40
F03-01	30	1/09/68		0.3		310	12.4			9.4	418			22	0.10	0.65	0.22	.04	.05	15	
F03-02	0	5/04/67	3.0	9.9	105	340	11.9	2.4	12.7	8.5		168	159	27	0.12	0.48	0.60	.03	.06	--	0.90
F03-02	0	7/27/67	3.0	23.0	95	280	7.4	2.6	10.8	7.9	--	190	161	18	0.30	0.06	0.40	.04	.05	8	1.35
F03-02	0	10/17/67	3.0	13.2	88	256	10.7	2.3	4.7	8.1	550	146	140	15	0.04	0.13	0.23	.04	.05	10	0.75
F03-02	0	1/09/68	1.8	0.5		300	13.9			8.9	496			20	0.11	0.46	0.25	.05	.06	10	
F03-02	13	5/04/67		9.9	110	360	11.4	2.4	12.6	8.6		195	204	25	0.10	0.38	0.36	.02	.05	--	1.10
F03-02	12	7/27/67		23.0	90	280	7.3	2.6	8.5	7.6	--	176	139	18	0.20	0.05	0.55	.06	.08	7	1.40
F03-02	12	10/17/67		13.2	88	248	10.5	1.8	6.9	8.2	496	152	142	16	0.04	0.13	0.35	.04	.05	10	0.80
F03-02	16	1/09/68		0.3		290	13.0			9.0	472			21	0.13	0.52	0.27	.05	.07	15	
F03-02	24	5/04/67		9.9	100	340	11.8	2.5	13.8	8.5		211	205	26	0.14	0.42	0.43	.03	.07	--	1.25
F03-02	23	7/27/67		23.0	95	285	7.2	2.2	10.0	7.7	--	158	129	18	0.39	0.05	0.36	.04	.05	8	1.45
F03-02	20	10/17/67		13.2	86	256	10.5	1.9	5.0	8.1	538	148	146	16	0.11	0.13	0.20	.04	.06	10	1.00
F03-02	29	1/09/68		0.3		300	13.2			9.1	472			21	0.14	0.63	0.16	.05	.07	15	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
F16-01	0	5/02/67	11.0	5.4	95	320	13.2	1.0	8.1	8.3		182	173	24	0.22	0.00	0.03	.01	.01	--	0.25
F16-01	0	7/28/67	13.0	22.6	100	300	9.4	1.4	11.9	9.1	--	182	161	23	0.08	0.06	0.62	.03	.03	0	0.40
F16-01	0	10/18/67	10.0	14.0	98	320	10.0	1.3	5.2	8.3	514	181	172	27	0.10	0.00	0.33	.02	.02	2	0.35
F16-01	0	1/13/68	7.0	1.5		290	13.8			8.6	520			20	0.10	0.38	0.24	.03	.05	2	
F16-01	30	5/02/67		5.4	95	320	13.0	0.9	7.9	8.3		177	175	23	0.19	0.00	0.11	.00	.01	--	0.25
F16-01	48	7/28/67		21.2	80	310	9.0	0.7	7.5	8.9	--	206	207	24	0.05	0.02	0.53	.03	.03	0	0.35
F16-01	30	10/18/67		14.1	98	328	10.0	1.4	4.7	8.0	508	181	174	26	0.08	0.00	0.37	.03	.03	2	0.45
F16-01	31	1/13/68		0.8		290	13.6			8.7	490			21	0.11	0.39	0.24	.04	.05	3	
F16-01	59	5/02/67		5.2	90	320	12.8	0.9	8.5	8.2		173	180	23	0.07	0.00	0.21	.01	.02	--	0.50
F16-01	60	7/28/67		12.0	90	330	3.5	0.5	7.9	8.7	--	178	180	25	0.24	0.10	0.39	.02	.03	0	0.70
F16-01	56	10/18/67		14.1	98	330	10.0	1.4	5.6	8.1	496	186	182	26	0.13	0.00	0.27	.02	.02	2	0.50
F16-01	60	1/13/68		0.5		290	13.4			8.9	496			20	0.10	0.38	0.37	.04	.05	4	
G04-01	0	5/04/67	2.5	9.0	90	300	10.6	0.8	11.9	7.7		157	154	16	0.12	0.27	0.44	.03	.06	--	1.55
G04-01	0	7/27/67	4.0	22.6	85	260	9.1	1.7	8.2	8.7	--	179	182	17	0.16	0.08	0.29	.03	.04	6	0.70
G04-01	0	10/17/67	4.0	12.8	92	288	10.7	1.9	6.7	8.2	526	170	164	22	0.12	0.15	0.38	.04	.05	6	0.45
G04-01	0	1/09/68	1.0	0.3		330	12.4	1.6		8.3	478			24	0.23	0.89	0.26	.07	.11	25	
G04-01	14	5/04/67		9.0	90	280	10.6	1.2	11.9	8.0		149	153	15	0.16	0.25	0.41	.04	.06	--	1.95
G04-01	15	7/27/67		22.5	85	260	9.1	1.8	9.2	8.7	--	181	154	17	0.20	0.10	0.50	.02	.05	4	0.70
G04-01	15	10/17/67		12.8	93	292	10.8	2.5	6.5	8.2	526	170	159	22	0.15	0.16	0.25	.04	.05	5	0.45
G04-01	15	1/09/68		0.5		330	12.2	1.4		8.3	478			25	0.24	0.91	0.21	.09	.12	25	
G04-01	26	5/04/67		9.1	85	270	10.8	0.8	11.9	7.9		164	146	16	0.17	0.32	0.33	.03	.06	--	1.50
G04-01	28	7/27/67		22.5	85	255	9.0	2.3	8.7	8.7	--	158	130	17	0.41	0.10	0.00	.03	.05	4	0.80
G04-01	26	10/17/67		12.8	96	292	10.5	2.9	6.7	8.1	520	171	160	22	0.12	0.14	0.29	.04	.06	7	0.40
G04-01	26	1/09/68		0.4		330	12.1	1.5		8.4	472			24	0.24	0.93	0.34	.07	.11	25	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
G06-01	0	5/04/67	2.0	8.4	95	250	10.8	0.4	10.8	8.5		139	110	10	0.04	0.33	0.34	.03	.04	--	1.70
G06-01	0	7/27/67	5.5	23.0	90	275	8.9	3.2	12.5	8.7	--	216	196	20	0.16	0.09	0.46	.06	.06	3	0.40
G06-01	0	10/17/67	5.0	12.9	82	236	10.5	1.4	10.1	7.5	550	139	138	14	0.07	0.18	0.17	.02	.03	5	1.30
G06-01	0	1/10/68	1.0	0.9		260	12.2		10.1	8.4	502				0.10	0.48	0.36	.06	.07	20	
G06-01	16	5/04/67		8.5	85	250	10.7	0.4	10.2	8.5		143	150	10	0.05	0.37	0.49	.02	.04	--	1.65
G06-01	27	7/27/67		23.0	90	275	8.7	1.9	10.8	8.7	--	199	184	21	0.05	0.10	0.50	.06	.07	3	0.50
G06-01	16	10/17/67		12.7	82	240	10.4	1.2	10.1	7.8	562	139	135	14	0.13	0.19	0.11	.02	.03	4	1.30
G06-01	16	1/10/68		0.8		260	12.3		9.1	8.4	484			13	0.10	0.46	0.28	.05	.08	20	
G06-01	30	5/04/67		8.5	90	250	10.9	0.5	10.2	8.5		164	161	10	0.03	0.32	0.04	.02	.04	--	1.65
G06-01	32	7/27/67		22.8	90	275	8.4	1.8	10.0	8.7	--	212	214	19	0.21	0.07	0.50	.05	.07	5	1.05
G06-01	28	10/17/67		12.8	83	240	10.4	1.5	12.0	7.5	550	137	133	14	0.05	0.17	0.29	.02	.03	6	1.20
G06-01	29	1/10/68		0.8		260	12.8		9.4	8.4	496			14	0.09	0.48	0.29	.04	.07	20	
G07-01	0	5/03/67	4.0	9.2	90	260	12.2	1.3	9.2	8.6		192	154	18	0.13	0.18	0.24	.02	.03	--	1.50
G07-01	0	7/27/67	6.0	22.7	90	250	7.9	1.2	7.5	8.6	--	199	199	16	0.08	0.07	0.36	.03	.03	3	1.20
G07-01	0	10/17/67	4.5	13.0	84	268	10.3	1.1	8.1	8.3	556	155	149	20	0.05	0.17	0.29	.02	.04	5	1.45
G07-01	0	1/10/68	1.5	1.3		310	12.4		12.0	8.4	520			23	0.20	0.71	0.37	.05	.08	20	
G07-01	25	5/03/67		8.8	85	270	11.8	0.2	9.8	8.6		192	152	17	0.07	0.26	0.38	.01	.03	--	1.55
G07-01	18	7/27/67		22.7	85	250	7.7	1.1	11.7	8.6	--	220	184	16	0.20	0.06	0.20	.03	.05	4	1.25
G07-01	17	10/17/67		12.9	83	264	10.3	1.1	8.9	8.0	550	158	146	20	0.04	0.17	0.20	.02	.02	5	1.40
G07-01	17	1/10/68		0.6		320	12.2		11.8	8.5	496			23	0.21	0.72	0.34	.08	.11	20	
G07-01	47	5/03/67		8.5	85	260	11.0	0.6	11.4	8.2		184	173	17	0.05	0.14	0.39	.01	.04	--	1.90
G07-01	34	7/27/67		22.5	85	250	7.9	1.0	7.9	8.6	--	192	189	15	0.13	0.07	0.26	.03	.04	3	1.50
G07-01	30	10/17/67		13.0	84	268	10.3	0.9	8.1	7.8	550	165	156	20	0.03	0.15	0.21	.02	.05	5	1.50
G07-01	32	1/11/68		0.5		340	11.8		13.2	8.7	508			27	0.22	0.86	0.44	.06	.13	25	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
G09-01	0	5/03/67	5.0	9.2	65	320	10.5	0.4	8.9	8.3		203	189	25	0.05	0.23	0.36	.03	.03	--	0.60
G09-01	0	7/27/67	6.0	22.8	85	270	7.1	0.8	7.5	8.4	--	195	189	17	0.18	0.03	0.17	.02	.02	3	1.65
G09-01	0	10/18/67	5.0	11.9	88	284	10.2	1.0	9.3	7.4	550	171	170	24	0.02	0.15	0.50	.02	.03	6	1.55
G09-01	0	1/11/68	4.0	0.2		290	12.1	0.7	8.2	8.5	532			21	0.18	0.38	0.25	.04	.07	8	
G09-01	18	5/03/67		9.2	100	310	11.0	0.6	7.4	8.1		196	192	28	0.12	0.27	0.48	.03	.03	--	0.50
G09-01	18	7/27/67		22.8	90	270	6.9	1.2	8.5	8.4	--	162	129	17	0.19	0.03	0.85	.02	.03	4	1.80
G09-01	18	10/18/67		11.9	84	292	10.2	1.3	8.1	7.6	550	175	169	25	0.09	0.15	0.38	.02	.04	6	1.60
G09-01	19	1/11/68		0.5		290	12.1	1.6	8.2	8.6	320			21	0.16	0.31	0.31	.04	.07	9	
G09-01	35	5/03/67		8.4	95	310	10.5	0.3	9.2	8.0		214	205	23	0.06	0.26	0.45	.02	.03	--	0.70
G09-01	34	7/27/67		22.8	85	260	7.1	2.1	6.9	8.5	--	178	118	17	0.18	0.03	0.35	.02	.04	6	2.15
G09-01	32	10/18/67		11.9	83	288	10.2	1.6	9.3	7.8	544	165	162	25	0.05	0.15	0.18	.02	.02	6	1.50
G09-01	35	1/11/68		0.3		290	11.8	1.5	5.1	8.7	538			21	0.16	--	0.24	.03	.07	10	
G10-01	0	5/03/67	2.0	9.2	80	290	10.6	0.9	9.2	7.6		214	192	24	0.06	0.22	0.34	.01	.04	--	0.75
G10-01	0	7/26/67	4.0	22.9	95	270	7.1	1.1	8.3	8.4	--	178	164	18	0.18	0.05	0.33	.02	.03	4	1.25
G10-01	0	10/18/67	3.0	12.6	93	268	10.2	1.7	9.7	7.4	538	169	163	19	0.07	0.15	0.33	.02	.04	7	1.35
G10-01	0	1/11/68	4.5	1.2		270	12.8		4.4	8.5	514			18	0.07	0.37	0.32	.01	.03	6	
G10-01	19	5/03/67		9.0	80	300	10.5	0.8	8.4	7.9		223	186	24	0.06	0.16	0.31	.03	.04	--	0.80
G10-01	18	7/28/67		22.8	95	270	7.1	1.2	8.4	8.5	--	182	158	19	0.21	0.05	0.27	.02	.04	3	1.20
G10-01	20	10/18/67		12.6	87	268	10.2	1.4	10.7	7.9	532	166	162	19	0.07	0.15	0.38	.02	.05	7	1.35
G10-01	19	1/11/68		1.1		270	12.6		10.1	8.6	502			19	0.05	0.36	0.33	.02	.03	6	
G10-01	36	5/03/67		8.3	90	300	10.3	0.7	9.4	7.6		224	202	23	0.08	0.13	0.56	.02	.05	--	0.90
G10-01	34	7/28/67		22.8	90	270	7.0	1.2	8.3	8.6	--	205	189	18	0.20	0.05	0.25	.02	.04	6	1.20
G10-01	36	10/18/67		12.4	90	266	10.2	1.5	10.5	8.0	526	167	153	19	0.09	0.15	0.28	.02	.04	7	1.55
G10-01	36	1/11/68		0.6		270	12.3		6.3	8.6	502			19	0.07	0.36	0.25	.02	.06	5	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
G12-01	0	5/03/67	6.0	10.3	90	280	10.8	1.4	7.2	8.2		199	170	21	0.14	0.23	0.29	.03	.03	--	0.35
G12-01	0	7/28/67	10.0	22.5	90	265	7.6	1.0	8.7	8.5	--	186	175	21	0.17	0.04	0.33	.02	.03	2	1.05
G12-01	0	10/18/67	5.0	12.8	90	280	10.4	1.8	11.0	7.3	550	167	159	21	0.25	0.00	0.37	.02	.03	4	0.50
G12-01	0	1/12/68	4.0	1.6		280	13.2		4.9	8.6	562			22	0.05	0.32	0.24	.03	.03	4	
G12-01	21	5/03/67		9.3	85	280	10.9	1.3	7.1	8.2		199	187	21	0.13	0.24	0.44	.02	.03	--	0.45
G12-01	29	7/28/67		22.0	95	260	7.3	0.8	8.5	8.5	--	184	176	19	0.26	0.07	0.10	.01	.02	2	1.20
G12-01	20	10/18/67		12.8	91	288	10.4	1.7	10.3	7.6	532	173	162	21	0.12	0.00	0.25	.02	.04	4	0.65
G12-01	20	1/12/68		0.8		290	13.0		6.3	8.7	568			21	0.05	0.32	0.30	.02	.03	5	
G12-01	40	5/03/67		8.7	85	280	10.5	1.2	6.2	8.2		185	182	20	0.10	0.21	0.38	.02	.03	--	0.50
G12-01	40	7/28/67		22.0	100	300	3.5	1.8	8.3	8.2	--	175	174	18	0.16	0.07	0.25	.02	.02	2	1.00
G12-01	36	10/18/67		12.9	89	284	10.4	1.6	9.9	7.8	526	160	156	21	0.19	0.00	0.15	.01	.04	5	0.60
G12-01	38	1/12/68		0.7		280	12.6		5.8	8.7	550			21	0.05	0.32	0.24	.02	.03	4	
G18-01	0	5/01/67	10.0	5.0	90	320	12.7	0.1	8.1	7.7		218	205	22	0.08	0.44	0.51	.01	.02	--	0.40
G18-01	0	7/28/67	18.0	22.5	95	320	9.4	1.2	9.2	9.0	--	203	201	25	0.02	0.00	0.34	.01	.01	0	0.05
G18-01	0	10/19/67	9.0	13.5	96	320	9.9	2.1	10.5	8.1	598	184	181	24	0.06	0.02	0.34	.01	.03	3	0.40
G18-01	0	1/13/68	11.0	1.3		320	14.3	2.7	6.8	8.7	484			24	0.02	0.08	0.41	.01	.02	1	
G18-01	36	5/01/67		4.8	95	310	12.9	0.5	8.5	7.7		206	188	22	0.08	0.43	0.51	.01	.01	--	0.25
G18-01	50	7/28/67		20.0	95	320	8.6	0.7	8.7	9.0	--	193	197	26	0.07	0.00	0.21	.01	.01	0	0.10
G18-01	35	10/19/67		13.6	101	310	9.9	1.9	9.7	8.3	604	211	208	24	0.22	0.02	0.12	.01	.02	2	0.40
G18-01	36	1/13/68		1.0		330	14.3	2.6	6.3	8.8	460			24	0.02	0.08	0.31	.02	.02	1	
G18-01	71	5/01/67		4.8	90	320	12.9	0.4	8.5	7.8		198	199	22	0.12	0.42	0.47	.01	.02	--	0.25
G18-01	72	7/28/67		10.2	95	320	5.4	0.7	9.2	7.8	--	205	196	25	0.12	0.03	0.30	.01	.02	0	1.80
G18-01	68	10/19/67		13.4	100	310	9.9	1.6	8.9	8.1	610	218	215	24	0.06	0.02	0.33	.01	.01	2	0.45
G18-01	70	1/13/68		0.7		320	14.2	2.9	7.8	8.8	472			25	0.01	0.08	0.34	.01	.03	1	

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
H20-01	0	5/01/67	10.0	5.0	90	310	13.0	0.7	7.9	8.0		195	199	23	0.14	0.07	0.20	.01	.02	--	0.25
H20-01	0	7/28/67	20.0	22.5	95	310	9.6	1.4	8.9	9.1	--	195	200	25	0.04	0.00	0.30	.02	.04	0	0.10
H20-01	0	10/19/67	9.0	13.4	99	320	9.9	1.2	8.9	8.3		222	220	25	0.06	0.02	0.36	.01	.02	2	0.60
H20-01	0										628										
H20-01	39	5/01/67		5.0	95	310	13.3	0.3	7.9	8.2		191	199	23	0.08	0.09	0.24	.01	.02	--	0.30
H20-01	54	7/28/67		19.2	95	310	8.3	0.5	8.7	9.0	--	195	181	24	0.13	0.02	0.19	.01	.01	0	0.20
H20-01	39	10/19/67		13.6	94	320	9.9	1.1	8.7	8.0		213	211	25	0.06	0.02	0.29	.01	.02	2	0.65
H20-01											610										
H20-01	77	5/01/67		5.0	95	310	13.3	0.6	9.6	8.0		213	186	23	0.15	0.09	0.26	.01	.02	--	0.25
H20-01	79	7/28/67		10.1	105	320	5.9	0.5	8.5	8.4	--	211	190	25	0.18	0.02	0.24	.01	.01	2	0.95
H20-01	74	10/19/67		13.5	96	320	9.9	1.0	8.7	8.3		214	206	25	0.08	0.02	0.35	.03	.03	2	0.60
H20-01											634										
123-01	0	5/01/67	10.0	4.8	95	320	13.1	0.8	8.5	8.2		194	186	22	0.16	0.20	0.29	.02	.02	--	0.35
123-01	0	7/29/67	16.0	22.2	90	300	9.0	1.3	9.8	8.9	412	194	185	23	0.16	0.05	0.42	.02	.02	0	0.25
123-01	0	10/19/67		13.4	100	320	10.0	1.2	9.1	8.3	604	217	211	24	0.07	0.02	0.38	.02	.02	2	0.55
123-01	0																				
123-01	40	5/01/67		4.7	95	310	13.2	0.5	11.7	8.3		189	183	22	0.11	0.18	0.42	.01	.02	--	0.55
123-01	57	7/29/67		19.2	95	310	7.2	0.8	7.3	8.5	490	178	185	24	0.19	0.04	0.17	.01	.01	0	0.30
123-01	40	10/19/67		13.4	96	324	9.9	1.1	8.7	8.1	622	218	215	25	0.11	0.02	0.29	.01	.02	2	0.55
123-01																					
123-01	78	5/01/67		4.5	90	310	13.1	0.7	11.4	8.2		197	182	22	0.08	0.18	0.24	.02	.02	--	0.25
123-01	80	7/29/67		10.0	95	320	6.1	0.8	7.7	8.0	490	197	190	25	0.18	0.05	0.52	.01	.01	0	0.95
123-01	76	10/19/67		13.4	100	324	9.9	1.1	9.9	8.1	610	223	221	25	0.18	0.02	0.37	.01	.02	2	0.70
123-01																					

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SiO_2
J25-01	0	5/01/67	11.0	4.5	95	310	13.1	0.5	11.2	8.3		205	200	24	0.13	0.04	0.37	.01	.02	--	0.20
J25-01	0	7/29/67	15.0	22.3	90	300	9.3	1.7	9.8	8.8	382	200	178	24	0.28	0.02	0.20	.02	.02	0	0.25
J25-01	0	10/20/67	9.0	13.2	102	320	10.0	1.5	7.9	8.1	538	217	209	24	0.11	0.03	0.38	.01	.02	3	0.35
J25-01	0																				
J25-01	38	5/01/67		4.5	115	310	13.3	0.5	12.1	8.2		200	207	23	0.05	0.04	0.28	.04	.05	--	0.20
J25-01	57	7/29/67		16.1	95	320	7.9	2.2	8.1	8.4	376	198	180	25	0.10	0.00	0.38	.01	.01	0	0.30
J25-01	39	10/20/67		13.1	96	320	9.9	1.3	8.1	7.7	514	213	203	24	0.11	0.02	0.24	.01	.01	2	0.35
J25-01																					
J25-01	75	5/01/67		4.2	85	320	13.2	0.2	12.5	8.2		197	194	24	0.07	0.02	0.37	.05	.06	--	0.25
J25-01	78	7/29/67		10.5	100	300	5.2	1.6	8.7	8.0	400	292	208	25	0.16	0.04	0.35	.01	.05	3	1.30
J25-01	74	10/20/67		13.2	95	320	10.0	1.5	8.3	7.8	562	216	210	24	0.05	0.10	0.28	.01	.01	1	0.40
J25-01																					
K28-01	0	4/30/67	9.0	5.5	90	320	13.3	0.4	9.6	7.7		207	204	24	0.04	0.01	0.57	.01	.01	--	0.25
K28-01	0	7/29/67	24.0	23.3	95	310	9.2	0.8	8.5	9.0	372	182	191	24	0.05	0.00	0.36	.01	.01	0	0.10
K28-01	0	10/20/67	10.5	13.1	95	320	10.0	1.2	8.1	8.0	604	213	209	26	0.07	0.03	0.29	.01	.01	1	0.45
K28-01	0																				
K28-01	37	4/30/67		4.5	95	320	13.4	0.3	8.7	8.1		204	207	24	0.27	0.00	0.10	.02	.02	--	0.25
K28-01	57	7/29/67		20.0	95	310	8.3	0.5	6.0	8.6	364	235	196	24	0.15	0.00	0.20	.01	.01	0	0.10
K28-01	37	10/20/67		13.2	95	340	10.0	1.1	9.5	8.0	598	207	207	25	0.05	0.03	0.27	.02	.02	1	0.45
K28-01	0																				
K28-01	73	4/30/67		4.5	95	320	13.2	0.4	7.9	8.2		203	204	24	0.08	0.01	0.34	.01	.02	--	0.20
K28-01	74	7/29/67		11.0	100	320	5.2	0.7	6.5	8.0	394	203	187	25	0.07	0.04	0.52	.01	.01	0	0.70
K28-01	70	10/20/67		13.1	95	330	10.0	1.1	8.9	7.9	592	215	210	25	0.06	0.01	0.29	.02	.02	1	0.60
K28-01																					

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
L30-01	0	4/30/67	11.0	5.5	95	320	12.9	0.1	8.9	8.4		197	206	24	0.08	0.00	0.44	.01	.01	--	0.15
L30-01	0	7/29/67	24.0	23.5	90	310	9.3	1.3	6.9	8.8	358	166	161	24	0.05	0.00	0.40	.01	.01	0.1	0.10
L30-01	0	10/20/67	10.0	13.2	97	330	10.0	1.1	8.5	8.3	580	214	211	24	0.10	0.00	0.21	.01	.01	1	0.30
L30-01	0																				
L30-01	35	4/30/67		4.5	100	320	13.0	0.2	8.3	8.3		205	202	24	0.03	0.00	0.49	.02	.02	--	0.20
L30-01	56	7/29/67		21.0	95	310	8.5	0.7	6.5	8.7	372	208	211	24	0.09	0.00	0.40	.01	.01	0.2	0.10
L30-01	36	10/20/67		13.2	99	330	10.0	1.2	9.3	8.0	580	222	221	24	0.09	0.01	0.32	.01	.01	1	0.45
L30-01																					
L30-01	70	4/30/67		4.5	100	320	12.7	0.2	12.5	8.5		199	202	24	0.04	0.00	0.31	.02	.02	--	0.15
L30-01	72	7/29/67		11.0	100	320	6.0	1.2	7.5	8.4	406	230	206	24	0.12	0.04	0.38	.02	.03	1.0	0.55
L30-01	68	10/20/67		13.2	98	330	10.0	1.0	10.2	8.0	580	225	216	24	0.24	0.01	0.17	.01	.02	1	0.40
L30-01																					
L33-01	0	4/30/67	10.0	4.8	95	320	12.9	0.1	8.3	8.3		193	196	24	0.06	0.01	0.42	.01	.02	--	0.15
L33-01	0	7/29/67	20.0	23.8	95	310	9.2	1.6	8.9	8.8	358	183	185	24	0.12	0.04	0.34	.01	.01	0.2	0.15
L33-01	0	10/22/67	14.0	13.4	100	310	10.1	2.3	8.9	8.2	514	220	216	23	0.09	0.01	0.22	.02	.02	1	0.20
L33-01	0																				
L33-01	35	4/30/67		5.0	95	320	13.3	0.3	9.2	8.2		202	175	23	0.07	0.00	1.43	.01	.02	--	0.15
L33-01	52	7/29/67		21.0	95	310	7.9	1.3	6.2	8.7	358	220	179	23	0.05	0.00	0.25	.01	.01	0.2	0.20
L33-01	34	10/22/67		13.4	100	320	10.0	2.0	8.5	8.2	490	199	197	23	0.16	0.01	0.21	.02	.02	1	0.20
L33-01																					
L33-01	68	4/30/67		4.5	100	320	12.8	0.1	10.2	8.4		201	185	25	0.04	0.02	0.48	.01	.03	--	0.45
L33-01	69	7/29/67		10.9	90	320	5.2	1.1	9.6	8.5	352	196	177	24	0.11	0.06	0.29	.01	.01	0.4	0.70
L33-01	64	10/22/67		13.3	100	320	9.9	2.0	8.9	8.2	496	201	198	24	0.10	0.02	0.22	.02	.02	1	0.25
L33-01																					

TABLE 1 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SiO_2
L36-01	0	4/30/67	13.0	15.5	95	330	12.8	0.1	11.4	8.5		184	180	28	0.30	0.00	0.32	.01	.01	--	0.15
L36-01	0	7/29/67	21.0	22.9	90	310	9.5	1.4	10.2	8.7	358	204	189	24	0.06	0.00	0.29	.01	.01	0.3	0.15
L36-01	0	10/22/67	12.0	13.6	98	320	10.3	1.6	9.3	8.3	478	240	232	25	0.08	0.02	0.21	.01	.02	0.9	0.20
L36-01	0																				
L36-01	35	4/30/67		5.0	100	310	12.7	0.3	10.8	8.3		167	152	27	0.08	0.00	0.35	.02	.02	--	0.20
L36-01	53	7/29/67		22.0	90	320	9.1	0.9	8.7	8.5	358	216	204	23	0.06	0.00	0.44	.01	.01	0.2	0.15
L36-01	35	10/22/67		13.2	98	330	10.2	1.3	9.3	8.1	460	253	221	24	0.20	0.02	0.14	.01	.03	0.9	0.20
L36-01																					
L36-01	68	4/30/67		4.5	100	320	12.6	0.3	8.3	8.3		162	154	27	0.24	0.00	0.27	.02	.03	--	0.15
L36-01	67	7/29/67		16.3	90	310	7.4	1.1	7.1	7.8	376	174	176	23	0.13	0.04	0.52	.01	.01	0.3	0.35
L36-01	66	10/22/67		13.0	97	320	10.0	1.2	9.3	8.1	460	251	245	24	0.04	0.03	0.38	.01	.02	0.9	0.20
L36-01																					
M38-01	0	4/30/67	8.0	2.5	105	320	13.3	0.1	8.2	8.0		159	156	27	0.24	0.12	0.51	.01	.02	--	0.25
M38-01	0	7/30/67	20.0	22.5	95	310	9.5	1.1	8.5	8.8	352	187	160	24	0.13	0.00	0.45	.01	.01	0.2	0.15
M38-01	0	10/22/67	16.0	13.2	100	320	10.3	1.5	8.7	8.3	454	285	282	25	0.04	0.03	0.36	.01	.01	1	0.25
M38-01	0																				
M38-01	36	4/30/67		2.5	100	340	13.4	0.1	7.8	8.0		159	153	27	0.13	0.12	0.35	.02	.02	--	0.25
M38-01	54	7/30/67		21.7	95	310	9.0	0.8	8.9	8.6	352	208	203	23	0.04	0.00	0.41	.01	.01	0.2	0.15
M38-01	31	10/22/67		12.8	104	310	10.0	1.0	9.1	7.8	436	291	276	25	0.08	0.03	0.30	.01	.02	1	0.35
M38-01																					
M38-01	72	4/30/67		2.5	100	320	13.0	0.1	7.3	8.2		227	226	33	0.09	0.12	0.37	.02	.03	--	0.25
M38-01	72	7/30/67		8.0	100	330	8.2	0.8	7.1	7.5	370	232	214	24	0.09	0.10	0.38	.01	.01	0.5	0.45
M38-01	59	10/22/67		11.8	90	310	9.1	0.9	8.5	7.9	442	298	291	25	0.05	0.02	0.24	.01	.01	2	0.80
M38-01																					

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
M41-01	0	4/30/67	12.0	2.5	96	320	13.1	0.0	8.7	7.7		157	144	20	0.05	0.11	0.52	.04	.06	--	0.15
M41-01	0	7/30/67	18.0	22.5	95	310	9.4	1.2	8.1	8.8	364	203	192	23	0.03	0.00	0.32	.01	.01	0.4	0.25
M41-01	0	10/22/67	15.0	14.0	100	320	10.3	1.4	8.9	8.3	418	243	242	25	0.12	0.02	0.18	.01	.01	1	0.30
M41-01	0																				
M41-01	58	4/30/67		2.5	100	320	13.2	0.0	7.1	7.8		143	148	27	0.15	0.12	0.37	.01	.02	--	0.15
M41-01	50	7/30/67		13.5	95	320	7.8	0.9	6.7	7.5	364	177	173	24	0.09	0.05	0.59	.01	.01	0.2	0.30
M41-01	58	10/22/67		13.6	99	320	10.1	1.0	8.5	8.1	412	255	252	24	0.20	0.02	0.21	.01	.01	0.7	0.25
M41-01																					
M41-01	114	4/30/67		2.3	100	330	13.1	0.1	8.3	7.8		150	152	27	0.05	0.11	0.36	.02	.03	--	0.15
M41-01	112	7/30/67		5.5	90	330	9.9	0.7	6.2	8.3	376	225	217	24	0.14	0.16	0.40	.02	.02	2	0.80
M41-01	112	10/22/67		8.1	103	330	6.5	0.6	9.5	7.3	418	274	257	24	0.06	0.19	0.23	.01	.02	7	1.40
M41-01																					
M43-01	0	4/30/67	11.0	2.0	95	330	13.1	0.2	6.9	8.3		152	157	27	0.07	0.16	0.40	.02	.02	--	0.15
M43-01	0	7/30/67	13.0	21.3	100	320	9.7	1.1	8.4	8.8	376	211	205	24	0.08	0.00	0.27	.01	.01	0.5	0.25
M43-01	0	10/22/67	13.0	12.4	98	320	10.7	1.7	8.3	8.2	382	244	243	24	0.12	0.04	0.22	.01	.02	0.9	0.20
M43-01	0																				
M43-01	72	4/30/67		2.0	95	320	13.3	0.4	6.2	8.3		222	220	27	0.05	0.12	0.33	.02	.02	--	0.25
M43-01	50	7/30/67		11.0	100	320	9.0	1.1	7.2	7.9	370	196	189	24	0.10	0.05	0.22	.01	.01	0.8	1.25
M43-01	110	10/22/67		11.0	98	320	9.7	0.8	10.2	7.7	394	263	241	24	0.06	0.08	0.26	.01	.01	1	0.50
M43-01																					
M43-01	142	4/30/67		2.0	100	330	13.2	0.1	8.1	8.3		223	228	27	0.03	0.12	0.51	.02	.03	--	0.20
M43-01	138	7/30/67		5.3	100	330	10.4	0.8	6.8	8.0	388	216	200	24	0.06	0.18	0.36	.02	.03	2	0.70
M43-01	136	10/22/67		6.3	100	330	7.1	0.8	9.3	7.4	394	266	256	25	0.06	0.21	0.21	.02	.02	3	1.10

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SIO_2
N45-01	0	4/29/67	11.0	2.0	95	340	13.2	0.6	7..	8.2		211	204	27	0.05	0.10	0.38	.01	.01	--	0.15
N45-01	0	7/30/67	14.0	21.7	100	320	9.6	1.4	7.2	8.8	358	230	176	23	0.03	0.00	0.39	.01	.01	0.3	0.30
N45-01	0	10/23/67	17.0	12.5	110	320	10.1	1.4	9.3	8.7	316	302	293	25	0.11	0.03	0.19	.01	.01	0.9	0.30
N45-01	0																				
N45-01	80	4/29/67		2.0	95	340	13.1	0.8	8.1	8.2		205	191	27	0.07	0.10	0.37	.01	.02	--	0.25
N45-01	40	7/30/67		16.5	95	320	8.6	1.0	7.8	8.2	358	180	187	24	0.21	0.03	0.17	.01	.01	0.8	0.25
N45-01	120	10/23/67		9.8	113	340	8.2	0.9	7.2	8.4	322	306	303	24	0.05	0.14	0.29	.01	.03	2	0.70
N45-01																					
N45-01	160	4/29/67		2.0	95	310	13.3	0.7	8.1	8.3		209	204	28	0.02	0.06	0.58	.01	.06	--	0.25
N45-01	160	7/30/67		5.2	95	330	10.5	1.1	7.6	7.8	370	189	181	24	0.08	0.18	0.27	.02	.02	1	0.85
N45-01	154	10/23/67		6.5	105	340	7.5	1.4	7.0	8.3	322	315	297	24	0.07	0.19	0.15	.01	.03	3	1.15
N45-01																					
047-01	0	4/29/67	8.0	2.0	95	320	13.1	0.4	9.6	8.0		213	151	27	0.09	0.04	0.53	.01	.01	--	0.15
047-01	0	7/30/67	16.0	21.9	90	310	9.3	1.1	8.2	8.2	358	197	190	23	0.13	0.02	0.21	.00	.01	0.2	0.25
047-01	0	10/23/67	18.0	13.0	100	310	10.1	1.2	9.5	9.5	448	240	235	25	0.07	0.03	0.18	.01	.02	0.6	0.20
047-01	0																				
047-01	79	4/29/67		2.0	95	320	13.1	0.7	6.7	8.2		190	178	26	0.03	0.09	0.37	.01	.02	--	0.20
047-01	55	7/30/67		18.2	90	320	8.2	0.9	6.6	7.4	370	193	197	24	0.08	0.00	0.40	.01	.01	0.1	0.25
047-01	130	10/23/67		10.8	100	320	4.0	0.8	8.1	7.9	442	269	256	24	0.06	0.08	0.25	.00	.01	2	0.65
047-01																					
047-01	157	4/29/67		2.0	95	320	13.3	0.3	6.9	8.1		231	180	27	0.08	0.11	0.39	.01	.02	--	0.45
047-01	175	7/30/67		5.2	95	320	10.6	0.8	5.6	7.0	394	202	193	25	0.16	0.19	0.14	.01	.02	1.0	0.50
047-01	177	10/23/67		7.1	99	320	7.5	0.6	7.6	7.7	442	280	267	23	0.17	0.19	0.19	.02	.02	6	1.20
047-01																					

TABLE I (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SiO_2
P49-01	0	4/29/67	8.0	3.2	95	330	13.3	1.1	8.5	8.6		229	189	27	0.04	0.09	0.47	.01	.02	--	0.2C
P49-01	0	7/30/67	20.0	21.5	95	310	9.2	1.0	6.4	9.0	388	212	208	24	0.06	0.01	0.25	.01	.01	0.2	0.25
P49-01	0	10/23/67	12.0	13.6	99	310	10.3	1.2	8.5	8.2	430	244	243	24	0.08	0.01	0.23	.01	.02	1	0.25
P49-01	0																				
P49-01	49	4/29/67		3.2	95	320	13.1	1.2	8.7	8.2		233	180	27	0.05	0.07	0.46	.01	.02	--	0.2C
P49-01	60	7/30/67		19.5	95	310	8.5	0.5	6.0	8.7	376	211	197	24	0.08	0.00	0.25	.01	.01	0.1	0.25
P49-01	48	10/23/67		13.4	97	320	10.2	1.0	10.3	8.2	418	262	257	24	0.04	0.00	0.36	.00	.02	1	0.35
P49-01																					
P49-01	96	4/29/67		3.2	95	320	13.4	1.1	12.9	8.4		238	222	27	0.04	0.00	0.65	.02	.05	--	0.65
P49-01	99	7/30/67		6.0	100	330	6.8	0.4	7.8	8.0	382	215	204	25	0.13	0.15	0.30	.03	.04	1.0	0.85
P49-01	92	10/23/67		13.2	98	320	10.0	0.9	8.3	8.1	412	216	210	25	0.05	0.00	0.30	.03	.02	4	0.35
P49-01																					
Q51-01	0	4/29/67	6.0	3.5	90	320	13.0	1.1	10.7	7.9		217	222	28	0.15	0.08	0.33	.01	.03	--	0.2C
Q51-01	0	7/30/67	18.0	21.1	100	320	9.2	1.0	6.6	8.8	370	210	211	25	0.05	0.00	0.34	.01	.01	0.1	0.15
Q51-01	0	10/23/67	10.5	14.2	101	320	10.3	1.0	8.5	8.2	406	215	214	25	0.05	0.02	0.27	.01	.01	2	0.35
Q51-01	0																				
Q51-01	37	4/29/67		3.5	90	320	13.0	1.1	10.7	7.9		214	218	27	0.06	0.06	0.55	.02	.02	--	0.2C
Q51-01	64	7/30/67		18.8	95	320	8.2	0.6	7.0	8.7	370	214	192	25	0.08	0.00	0.21	.00	.01	0.1	0.25
Q51-01	36	10/23/67		13.6	99	320	10.2	1.0	8.5	8.1	400	216	207	25	0.08	0.00	0.34	.01	.02	2	0.25
Q51-01																					
Q51-01	72	4/29/67		3.5	95	320	13.0	1.5	11.7	7.9		241	205	28	0.06	0.04	0.77	.02	.03	--	0.25
Q51-01	74	7/30/67		13.1	95	320	6.2	0.7	6.0	7.9	400	225	185	25	0.15	0.10	0.30	.01	.01	0.2	0.75
Q51-01	69	10/23/67		13.4	101	320	10.2	1.4	8.1	8.2	400	204	203	25	0.05	0.00	0.23	.01	.02	2	0.3C
Q51-01																					

TABLE I (concluded)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE WATER CHEMISTRY

STA.NO.	D	DATE	S.D.	T.	ALK	CON	DO	BOD_5	COD	pH	Eh	TS	TDS	CL	NH_3 N	NO_3 N	ORG N	SP	TP	TB	SiO_2
R53-01	0	4/29/67	8.0	4.0	90	320	13.1	1.8	8.5	8.1		226	195	27	0.07	0.08	.0154	.01	.02	--	0.20
R53-01	0	7/30/67	24.0	21.1	100	310	9.1	0.9	5.6	8.7	370	238	234	24	0.15	0.00	0.23	.01	.02	0.2	0.15
R53-01	0	10/23/67	10.0	13.8	101	320	10.5	1.4	8.9	8.4	388	206	205	25	0.06	0.00	0.27	.02	.03	2	0.30
R53-01	0																				
R53-01	32	4/29/67		4.0	95	320	13.0	2.3	8.4	8.0		155	144	27	0.12	0.03	0.29	.02	.03	--	0.20
R53-01	32	7/30/67		21.1	100	310	9.1	1.4	7.2	8.7	370	231	195	26	0.29	0.00	0.18	.01	.02	0.2	0.25
R53-01	31	10/23/67		13.2	97	320	10.2	1.2	8.9	8.2	382	202	200	25	0.09	0.00	0.23	.02	.02	2	0.30
R53-01																					
R53-01	62	4/29/67		4.0	95	320	12.4	1.7	8.9	8.2		156	124	27	0.06	0.06	0.39	.02	.03	--	0.20
R53-01	62	8/30/67		21.0	95	310	9.1	0.8	5.6	8.7	364	229	170	26	0.06	0.00	0.34	.01	.01	0.1	0.15
R53-01	59	10/23/67		12.9	99	330	10.2	1.0	9.3	8.3	388	202	199	25	0.05	0.00	0.23	.02	.02	2	0.25
R53-01																					
S55-01	0	4/29/67	6.0	5.0	100	330	13.2	2.4	8.7	8.4		173	126	26	0.08	0.18	0.39	.04	.05	--	0.40
S55-01	0	7/30/67	16.0	21.3	100	310	9.1	1.0	6.8	8.8	418	225	220	25	0.06	0.00	0.55	.01	.01	0.3	0.15
S55-01	0	10/23/67	11.0	13.6	99	320	10.8	1.2	8.9	8.3	382	205	191	25	0.03	0.00	0.44	.01	.02	2	0.35
S55-01	0																				
S55-01	21	4/29/67		5.0	100	320	13.2	2.2	8.7	8.2		173	141	26	0.10	0.18	0.49	.04	.06	--	0.50
S55-01	21	7/30/67		21.0	95	310	9.1	1.3	8.6	8.7	400	218	215	26	0.03	0.00	0.58	.01	.01	0.3	0.20
S55-01	21	10/23/67		13.2	100	320	10.6	1.2	8.9	8.2	370	206	202	25	0.05	0.00	0.23	.02	.02	2	0.25
S55-01																					
S55-01	40	4/29/67		5.0	100	330	13.1	2.9	12.5	8.3		179	147	26	0.11	0.11	0.58	.09	.13	--	0.50
S55-01	40	7/30/67		21.2	95	310	9.1	0.9	9.2	8.7	424	207	202	26	0.04	0.00	0.29	.00	.01	0.3	0.20
S55-01	38	10/23/67		12.9	97	320	10.2	0.9	8.3	8.2	370	217	207	25	0.06	0.00	0.23	.01	.02	2	0.35
S55-01																					

TABLE 2

DETROIT PROGRAM OFFICE
WATER CHEMISTRY - WESTERN BASIN - 1967

STA. NO.	DATE	D	T	CON	CL	Phenols	D.O.	Total P	Sol. P	NO_3-N	NH_3-N	ORG-N	Total Coliform	SS	Sulfate
L6	4/20/67	0	7.5	220	9	8	11.2	.03	.00	0.6	0.41	0.05	490	11	--
	6/07/67	0	18.5	280	25	1	7.7	.16	.14	0.3	0.32	--	5,400	2	19
	6/20/67	0	19.0	240	13	8	8.0	.07	.05	0.3	0.32	<0.05	2,200	26	17
L8	4/20/67	0	9.5	380	39	5	11.3	.06	.05	1.6	1.12	0.25	340	14	--
	6/07/67	0	19.0	260	19	5	9.2	.10	.08	0.2	--	0.36	130	1	19
	6/20/67	0	19.0	240	13	6	10.8	.07	.05	0.3	0.24	<0.05	1,900	16	17
L9	4/20/67	0	8.5	315	32	6	11.4	.06	.01	0.7	0.35	0.05	13,000	14	--
	6/07/67	0	18.0	220	10	1	9.4	.09	.05	0.2	--	0.27	120	2	17
	6/20/67	0	20.0	260	17	6	7.6	.07	.06	0.2	0.31	<.05	300	20	17
L11	4/20/67	0	8.5	260	19	7	11.5	.04	.02	1.3	0.23	<0.05	110	8	--
	6/07/67	0	20.0	270	21	21	10.6	.04	.07	0.2	0.23	.36	94	4	19
	6/20/67	0	20.5	320	24	9	7.0	.13	.08	0.2	0.41	<0.05	490	27	24
L14	4/20/67	0	11.5	540	28	5	10.3	.07	.01	3.6	0.34	0.18	10,000	70	--
	6/07/67	0	21.0	320	25	10	9.9	.08	.06	0.9	0.47	0.23	36	4	31
	6/20/67	0	21.0	300	20	1	7.5	.10	.07	0.6	0.32	<0.05	3,200	28	24
L17	4/20/67	0	8.0	230	10	12	11.5	.02	.01	1.4	0.19	<0.05	70	10	--
	6/07/67	0	20.0	290	23	14	11.5	.07	.05	0.4	0.25	0.31	<2	6	25
	6/20/67	0	21.5	280	18	3	7.5	.09	.12	0.3	0.25	<0.05	5,600	22	22
L21	4/20/67	0	8.5	350	42	12	12.1	.07	.05	0.5	0.47	0.07	800	17	--
	6/07/67	0	19.0	320	35	8	7.7	.21	.16	0.3	0.49	--	1,800	9	20
	6/20/67	0	20.5	260	20	2	6.8	.16	.14	0.5	0.52	<0.05	14,000	8	19

TABLE 2 (continued)

DETROIT PROGRAM OFFICE
WATER CHEMISTRY - WESTERN BASIN - 1967

STA. NO.	DATE	D	T	CON	CL	Phenols	D.O.	Total P	Sol. P	NO_3-N	NH_3-N	ORG-N	Total Coliform	SS	Sulfate
L23	4/20/67	0	10.5	350	34	6	10.8	.05	.02	1.6	0.26	0.21	720	10	--
	6/07/67	0	21.0	310	29	6	9.6	.11	.09	0.1	0.26	--	390	6	25
	6/20/67	0	20.5	360	33	4	7.6	.22	.12	0.7	0.75	0.14	480	31	31
L26	4/20/67	0	10.5	450	26	4	10.6	.07	.04	3.3	0.60	0.25	140	42	--
	6/07/67	0	20.5	360	23	1	9.9	.09	.07	1.6	0.10	0.23	20	20	42
	6/20/67	0	21.5	340	22	<1	7.0	.13	.09	1.3	0.33	0.19	82	58	39
L40	4/20/67	0	8.0	240	21	7	12.0	.02	.01	0.9	0.09	0.05	> 68	5	--
	6/07/67	0	20.0	255	16	3	10.6	.05	.03	0.4	0.13	0.36	< 2	3	19
	6/20/67	0	21.0	260	17	1	8.6	.05	.04	0.2	0.13	0.16	14	12	19
L41	4/20/67	0	8.5	285	27	6	12.4	.02	.02	0.8	0.10	0.09	30	13	--
	6/07/67	0	20.5	320	24	<1	10.6	.08	.05	1.2	0.13	0.34	< 2	2	31
	6/20/67	0	21.5	260	17	8	7.4	.09	.07	0.4	0.14	0.16	24	39	20
L42	4/20/67	0	8.5	230	15	8	11.7	.01	.01	0.9	0.41	0.27	130	12	--
	6/07/67	0	20.0	335	22	3	10.3	.06	.04	1.4	0.16	0.45	2	5	35
	6/20/67	0	22.0	320	20	<1	6.3	.21	.11	0.9	--	0.06	20	68	27
L43	4/20/67	0	9.0	275	22	10	11.8	.04	.02	1.0	1.35	0.27	100	16	--
	6/07/67	0	20.0	325	23	1	10.9	.07	.05	1.1	0.14	0.92	2	7	32
	6/20/67	0	22.0	340	21	4	6.7	.31	.12	1.2	--	0.13	130	65	35
L50	4/17/67	0	8.5	280	18	5	11.9	.02	.01	1.1	0.26	0.10	1,300	17	--
	6/13/67	0	21.5	--	26	3	9.5	.02	.01	0.2	0.22	0.13	180	5	19
	7/10/67	0	23.0	280	23	-	9.8	.16	.10	--	0.18	0.11	58	3	17
	8/16/67	0	21.5	340	41	8	9.4	.03	.01	<.1	0.11	0.16	730	5	20

TABLE 2 (continued)

DETROIT PROGRAM OFFICE
WATER CHEMISTRY - WESTERN BASIN - 1967

STA. NO.	DATE	D	T	CON	CL	Phenols	D.O.	Total P	Sol. P	NO_3-N	NH_3-N	ORG-N	Total Collform	SS	Sulfate
L51	4/17/67	0	7.5	270	19	6	12.0	.01	.01	0.7	0.26	0.21	2	4	--
	6/13/67	0	20.0	--	25	4	9.7	.01	.01	0.1	0.16	0.41	6	4	17
	7/10/67	0	22.0	240	15	-	11.8	.11	.09	--	0.12	--	26	1	18
	8/16/67	0	21.0	280	28	4	9.5	.01	.01	0.1	0.12	0.17	150	4	16
L52	4/17/67	0	6.5	290	24	8	12.5	.02	.02	0.3	0.19	0.16	1	2	--
	6/13/67	0	22.0	--	22	3	9.5	.02	.01	0.2	0.28	0.14	3	0	20
	7/10/67	0	23.0	280	20	-	10.9	.22	.13	--	0.07	0.14	1	2	19
	8/16/67	0	22.0	270	27	5	9.6	.01	.01	0.1	0.09	0.14	11	8	16
L53	4/17/67	0	6.0	290	23	5	12.4	.03	.01	0.2	0.17	0.13	<1	1	--
	6/13/67	0	20.0	--	20	1	9.5	.02	.00	0.1	0.13	0.09	15	1	19
	7/10/67	0	22.0	280	19	-	9.9	.25	.12	--	0.26	0.22	20	1	19
	8/16/67	0	22.0	260	22	16	10.4	.02	.01	0.3	0.32	--	<1	6	18
L54	6/13/67	0	20.0	--	19	-	9.7	.02	.03	0.2	0.21	0.14	1	4	22
	7/10/67	0	22.0	280	20	-	8.4	.12	.12	--	0.09	0.13	70	1	20
	8/16/67	0	22.0	280	23	5	11.1	.02	.01	<.1	0.13	0.23	70	2	19
L55	6/13/67	0	21.0	--	19	1	9.8	.03	.03	0.2	0.15	0.18	4	0	22
	7/10/67	0	22.0	300	20	-	8.5	.15	.14	--	0.17	0.10	6	1	21
	8/16/67	0	22.0	280	24	4	10.0	.02	.01	<.1	0.15	0.28	2	3	20
L56	6/13/67	0	21.5	--	17	2	9.6	.02	.02	0.2	0.47	0.11	4	0	20
	7/10/67	0	22.5	320	21	-	9.6	.17	.09	--	0.18	0.14	<1	3	22
	8/16/67	0	22.0	300	27	3	9.9	.02	.01	<.1	0.07	0.20	70	4	21

TABLE 2 (concluded)

DETROIT PROGRAM OFFICE
WATER CHEMISTRY - WESTERN BASIN - 1967

STA. NO.	DATE	D	T	CON	CL	Phenols	D.O.	Total P	Sol. P	NO_3-N	NH_3-N	ORG-N	Total Coliform	SS	Sulfate
L57	6/13/67	0	22.0		21	1	9.2	.02	.00	0.3	0.68	0.13	< 2	1	22
	7/10/67	0	22.5	320	21	-	9.0	.14	.08	--	0.21	0.34	40	9	24
	8/16/67	0	22.0	320	28	8	9.8	.01	.00	<.1	0.18	0.16	1	9	24
L58	4/17/67	0	7.5	275	20	7	12.4	.02	.01	0.4	0.17	0.18	<2	1	--
	6/13/67	0	23.0	--	21	-	8.4	.03	.02	0.4	--	--	6	0	24
	7/10/67	0	23.0	330	23	-	9.0	.14	.08	--	0.10	--	40	2	23
	8/16/67	0	23.0	330	31	4	10.1	.01	.00	<.1	0.05	0.16	<1	3	23
L59	4/17/67	0	8.0	255	18	6	11.9	.01	.01	0.3	0.23	0.11	2	1	--
	6/13/67	0	24.5	--	19	5	9.9	.01	.01	1.1	0.15	0.09	<2	3	29
	7/10/67	0	23.0	280	21	-	9.5	.14	.09	--	0.09	0.13	1	1	17
	8/16/67	0	24.0	320	24	3	10.0	.03	.00	<.1	0.41	0.06	<1	1	20
L60	4/17/67	0	8.5	265	20	8	12.4	.03	.01	0.8	0.27	0.13	22	5	--
	6/13/67	0	25.0	--	20	<1	9.6	.01	.01	0.7	0.18	0.27	<2	0	23
	7/10/67	0	--	280	18	-	11.9	.13	.10	--	0.10	0.13	50	2	16
	8/16/67	0	24.0	300	20	5	12.0	.04	.01	<.1	0.06	0.14	2	5	17
L61	4/17/67	0=	8.5	310	18	6	12.8	.03	.01	1.3	0.05	0.59	360	9	--
	6/13/67	0	24.5	--	20	21	9.9	.02	.02	0.3	0.41	0.22	<2	0	20
	7/10/67	0	--	290	19	-	9.8	.15	.08	--	0.08	0.10	11	2	15
	8/16/67	0	24.0	280	18	5	11.5	.07	.04	0.2	0.07	0.18	90	5	16
L62	4/17/67	0	9.5	310	18	<1	12.3	.04	.01	1.4	0.18	0.14	320	24	--
	6/13/67	0	22.0	--	25	<1	9.7	.01	.00	0.3	0.08	0.23	6	3	15
	7/10/67	0	21.5	320	23	-	8.9	--	--	--	0.06	0.08	420	5	17
	8/16/67	0	24.0	300	15	4	9.0	.01	.01	0.4	0.07	0.15	68	6	16

TABLE 3

WATER CHEMISTRY COMPARISONS 1963-64 - 1967-68
(Cleveland Program Office Data)

		Western Basin			%	Central Basin			%	Eastern Basin			%	Total
		max.	min.	avg.	Change	max.	min.	avg.	Change	max.	min.	avg.	Change	Lake Avg.
Conductivity	1963-64	364	196	272		353	260	300		328	284	301		298.9
	1967-68	370	238	285	+4.8	330	283	312	+3.7	333	310	318	+5.6	312.6
Dissolved Solids	1963-64	220	110	162		239	137	178		233	150	179		177.6
	1967-68	247	135	170	+4.9	283	147	196	+10.1	297	138	204	+14.0	197.3
Total Solids	1963-64	250	140	181		218	159	185		240	167	188		185.8
	1967-68	356	149	188	+3.9	307	153	202	+9.2	308	175	220	+17.0	207.1
Chlorides	1963-64	34	10	21		46	19	24		31	21	24		23.9
	1967-68	26	10	19	-9.5	29	19	23	-4.2	28	24	25	+4.2	23.4
Silica	1963-64	5.0	0.3	1.20		9.6	0.2	0.68		3.5	0.2	0.47		0.64
	1967-68	1.87	0.43	1.06	-11.7	0.98	0.15	0.37	-45.6	0.72	0.18	0.37	-21.2	0.40
Soluble Phosphorus	1963-64	0.33	0.00	0.03		0.07	0.00	0.01		0.04	0.00	0.01		0.011
	1967-68	0.10	0.01	0.04	+33.3*	0.03	0.00	0.02	+100.0*	0.02	0.01	0.01	0.0	0.018
Total Phosphorus	1963-64	--	--	--		--	--	--		--	--	--		
	1967-68	0.19	0.02	0.06		0.05	0.01	0.02		0.08	0.01	0.02		0.022
Total Nitrogen	1963-64	2.66	0.17	0.71		1.30	0.07	0.43		1.18	0.10	0.42		0.44
	1967-68	1.98	0.27	0.74	+4.2	0.95	0.28	0.47	+9.3	0.75	0.30	0.47	+11.9	0.48
Organic Nitrogen	1963-64			0.36				0.25				0.24		0.25
	1967-68	0.71	0.07	0.37	+2.3	0.78	0.12	0.32	+28.0*	0.55	0.21	0.34	+41.6*	0.33

TABLE 3 (Concluded)

WATER CHEMISTRY COMPARISONS 1963-64 - 1967-68
(Cleveland Program Office Data)

		Western Basin			%	Central Basin			%	Eastern Basin			%	Total
		max.	min.	avg.	Change	max.	min.	avg.	Change	max.	min.	avg.	Change	Lake Avg.
Ammonia Nitrogen	1963-64	0.77	0.01	0.16		0.39	0.00	0.09		0.32	0.00	0.09		0.09
	1967-68	0.56	0.04	0.17	+6.3	0.21	0.02	0.10	9.0	0.17	0.04	0.07	-22.2	0.09
Nitrate Nitrogen	1963-64	1.50	0.02	0.12		0.84	0.00	0.09		0.85	0.01	0.09		0.09
	1967-68	0.96	0.01	0.20	66.7*	0.43	0.00	0.05	-44.4	0.16	0.00	0.06	-33.3	0.06
Chemical Oxygen Demand	1963-64	29.0	1.1	10.4		16.0	3.1	7.1		27.0	4.7	7.4		7.36
	1967-68	18.9	5.5	9.8	-5.8	11.9	5.2	8.6	+21.1*	11.0	6.1	8.2	+10.8	8.53
5-Day Biochemical Oxygen Demand	1963-64	--	--	--		--	--	--		--	--	--		
	1967-68	4.1	0.4	1.7		2.7	0.0	1.0		2.5	0.2	1.2		1.10
Alkalinity	1963-64	240	57	99		130	71	97		134	59	99		
	1967-68	105	75	90	-9.9	102	92	96	-1.0	109	92	98	-1.0	96.3
Eh	1963-64	--	--	--		--	--	--		--	--	--		
	1967-68	560	474	511		612	354	470		444	324	385		445
pH	1963-64													
	1967-68	8.8	7.6	8.3		8.9	7.7	8.4		8.7	7.5	8.3		8.36

* Eliminated from average to insure statistical validity.

TABLE 4

DETROIT PROGRAM OFFICE

MICHIGAN WATERS OF LAKE ERIE
COMPARATIVE DATA - 1963 and 1967

		Max.	Min.	Avg.
Conductivity	1963	--	--	--
	1967	540	220	296
Chlorides	1963	46	14	25
	1967	42	9	23
Phenols	1963	16	0	3
	1967	21	<1	6
Total Phosphorus	1963	0.25	0.04	0.08
	1967	0.31	0.01	0.09
Soluble Phosphorus	1963	--	--	--
	1967	0.16	0.00	0.06
Nitrate Nitrogen	1963	0.5	0.1	0.3
	1967	3.6	<0.1	0.9
Ammonia Nitrogen	1963	0.58	0.05	0.25
	1967	1.35	<0.05	0.37
Organic Nitrogen	1963	0.62	0.08	0.25
	1967	0.92	<0.05	0.18
Suspended Solids	1963	--	--	--
	1967	70	0	19
Sulfate	1963	--	--	--
	1967	42	15	25

TABLE 5

DETROIT AND CLEVELAND PROGRAM OFFICES

COMPARISON OF 1967-68 CLEVELAND AND DETROIT DATA
FOR WESTERN BASIN

		Basin Average	Combined Average
Conductivity	DPO	296	290
	CPO	285	
Chlorides	DPO	22	20
	CPO	19	
Total Phosphorus	DPO	0.07	.06
	CPO	0.06	
Soluble Phosphorus	DPO	0.05	.04
	CPO	0.04	
Nitrate-N	DPO	0.6	0.4
	CPO	0.2	
Ammonia-N	DPO	0.28	0.22
	CPO	0.17	
Organic-N	DPO	0.18	0.27
	CPO	0.37	
Suspended Solids	DPO	11	14
	CPO	17	

In the central basin, all chemical constituents show increases except chlorides, silica, and nitrate nitrogen, while in the eastern basin the only decreases are in silica, ammonia nitrogen, and nitrate nitrogen.

The average dissolved solids have increased 9 percent during this period in spite of the fact that chlorides and silica have decreased. The average specific conductance has also increased indicating that the increase in dissolved solids is due to inorganic constituents. Future work will endeavor to describe these inorganic constituents. Silica is apparently paralleled by extensive increases in diatom populations in each basin. Diatoms metabolically assimilate dissolved silica in skeletal formation.

SEDIMENT CHEMISTRY

The role of bottom sediments in Lake Erie, as in other temperate, eutrophic lakes, has great significance especially during summer thermal stratification. During this period, convective mixing between the temperature-density stratified water is severely limited. The bottom layer, isolated from atmospheric replenishment, eventually becomes depleted of dissolved oxygen due to uptake by sedimented plankton. This leads directly to an accelerated nutrient cycle between sediment and water.

With development of anaerobic conditions at the sediment-water interface, the reduced forms of iron, manganese, and sulfur, along with phosphorus, ammonia, and carbon dioxide are leached from the sediment to the overlying waters. The effect is a nutritional stimulus to plankton. The death and sedimentation of these plankton renew the sources of sediment organic matter, which are again bacteriologically degraded in a succeeding stratification leading to another hypolimnetic deoxygenation and nutritional enrichment.

It is suspected that a lake can reach a state of eutrophication or enrichment whereby, in spite of elimination of all waste inputs, the bottom sediments become such that the above cycle would be indefinitely perpetuated.

In an attempt to study the state of eutrophication in Lake Erie, bottom sediments were analyzed during the various seasons of the year, (see Table 6). A comparison with respect to basin averages for the years 1963-64, and 1967-68, is given in Table 7.

Substantial increases in sediment phosphorus and ammonia nitrogen were noted in all basins. Sediment organic nitrogen increased in the western and eastern basins while decreasing in the central. Sediment nitrate nitrogen showed decreases in the central and eastern basins while remaining constant in the western.

TABLE 6

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE SEDIMENT CHEMISTRY

STA. NO.	D	DATE	pH	Eh	T	BOD_5	IDOD	COD	%VS	TP	NH_3-N	NO_3-N	ORG-N	TFE
D09-01	44	5/03/67	7.5		9.0	--	--	--	--	--	--	--	--	--
D09-01	64	7/28/67	5.1		20.0	3.8	--	80.4	9.7	--	0.64	0.0000	3.79	41.56
D09-01	46	10/18/67	7.1		12.7	2.0	0.8	65.3	10.2	2.19	0.41	0.0018	1.90	
D09-01														
D13-01	46	5/02/67	7.5		6.0	--	--	--	--	--	--	--	--	--
D13-01	49	7/28/67	5.1		16.0	1.6	--	55.0	6.3	--	0.17	0.0002	0.06	27.31
D13-01	46	10/18/67	7.0		13.5	1.0	0.4	31.4	4.6	0.67	0.15	0.0015	0.86	--
D13-01	47	1/12/68	7.4	478	2.2	1.6	0.2	74.9	8.5	0.93	0.11	0.0016	2.06	30.31
E02-01	28	5/04/67	7.2		11.0	--	--	--	--	--	--	--	--	--
E02-01	31	7/26/67	--		23.0	2.1	--	109.1	7.3	--	0.20	0.0000	2.36	27.78
E02-01	34	10/16/67			12.5	2.1	0.3	74.4	7.8	1.13	0.48	0.0017	2.00	--
E02-01	32	1/09/68	7.8	274	1.8	1.7	0.2	74.0	7.5	1.26	0.23	0.0008	1.91	28.75
E05-01	24	5/04/67	8.5		8.5	--	--	--	--	--	--	--	--	--
E05-01	26	7/27/67	4.4		--	0.9	--	27.2	3.1	--	0.08	0.0000	0.90	19.30
E05-01	25	10/17/67	7.3		12.5	1.0	0.4	30.5	6.0	0.66	0.33	0.0007	1.04	--
E05-01	26	1/10/68	7.3	370	2.0	3.1	0.5	83.3	8.3	1.23	0.38	0.0019	2.58	42.14
F03-01	33	5/04/67	--		--	--	--	--	--	--	--	--	--	--
F03-01	34	7/26/67	--		21.9	3.1	--	89.2	8.0	--	0.49	0.0005	3.59	37.80
F03-01	32	10/16/67			13.4	2.2	0.5	71.3	14.5	0.95	0.55	0.0012	2.28	--
F03-01	33.5	1/09/68	7.8	418	1.5	1.4	0.1	56.5	7.2	0.86	0.19	0.0011	1.38	29.60
F03-02	26	5/04/67	7.6		9.0	--	--	--	--	--	--	--	--	--
F03-02	25	7/27/67	3.7		21.5	2.3	--	84.1	8.1	--	0.42	0.0003	2.82	35.53
F03-02	25	10/17/67	7.4		12.8	1.6	0.7	70.0	10.2	0.77	0.37	0.0010	1.87	--
F03-02	32	1/09/68	7.9	130	1.6	2.2	0.4	82.8	9.5	0.97	0.39	0.0012	2.19	36.38

TABLE 6 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE SEDIMENT CHEMISTRY

STA. NO.	D	DATE	pH	Eh	T	BOD_5	TDOD	COD	%VS	TP	NH_3-N	NO_3-N	ORG-N	TFE
F16-01	61	5/02/67	8.5		--	--	--	--	--	--	--	--	--	--
F16-01	62	7/28/67	5.7		10.0	1.2	--	46.2	5.6	--	0.15	0.0002	2.07	33.62
F16-01	60	10/18/67	7.1		14.2	1.1	0.5	47.2	7.4	0.63	0.33	0.0013	1.64	--
F16-01	63	1/13/68	7.5	430	2.6	1.0	0.3	50.2	6.7	0.56	0.19	0.0024	1.71	37.12
G04-01	28	5/04/67	7.4		9.5	--	--	--	--		--	--	--	--
G04-01	30	7/27/67	4.9		20.5		--	29.0	3.1		0.05	0.0000	0.08	34.38
G04-01	30.5	10/17/67	7.4			1.1	0.7	61.4	8.6	0.75	0.38	0.0010	1.72	--
G04-01	29	1/09/68	8.0	274	1.0	0.6	0.1	27.1	4.8	0.48	0.07	0.0009	0.68	15.63
G06-01	32	5/04/67	8.1		8.0	--	--	--	--		--	--	--	--
G06-01	34	7/27/67	4.2		19.0	2.0	--	76.1	7.7		0.24	0.0003	2.61	20.05
G06-01	32	10/17/67	7.2		12.5	0.8	0.7	94.7	8.8	0.82	0.38	0.0006	1.89	--
G06-01	32	1/10/68	7.8	--	2.4	1.7	0.4	78.6	8.9	0.82	0.32	0.0014	1.86	41.40
G07-01	49	5/03/67	7.8		8.5	--	--	--	--		--	--	--	--
G07-01	36	7/27/67	5.0		20.0	1.9	--	75.1	7.9		0.28	0.0046	2.61	33.90
G07-01	34	10/17/67	7.3		12.5	0.7	0.5	64.3	11.8	0.66	0.31	0.0006	1.62	--
G07-01	35	1/10/68	7.9	310	2.1	1.7	0.5	81.8	10.0	0.65	0.35	0.0020	2.44	36.84
G09-01	37	5/03/67	7.0		8.0	--	--	--	--		--	--	--	--
G09-01	36	7/27/67	4.6		21.0	1.4	--	55.9	6.3		0.24	0.0007	0.07	32.28
G09-01	36	10/18/67	7.3		12.0	1.4	0.5	60.9	9.6	0.87	0.41	0.0008	1.94	--
G09-01	38	1/11/68	7.7	88	1.9	0.8	0.2	46.3	4.9	0.48	0.11	0.0005	1.49	29.22
G10-01	38	5/03/67	6.9		--	--	--	--	--	--	--	--	--	--
G10-01	36	7/28/67	4.8		20.0	1.4	--	54.0	6.1	--	0.28	0.0016	2.33	30.20
G10-01	40	10/18/67	7.4		12.5	0.8	0.5	51.6	8.0	0.62	0.29	0.0005	1.43	--
G10-01	39	1/11/68	7.4	202	2.6	1.1	0.3	56.3	8.3	0.35	0.18	0.0007	1.72	32.69

TABLE 6 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE SEDIMENT CHEMISTRY

STA. NO.	D	DATE	pH	Eh	T	BOD_5	IDOD	COD	%VS	TP	NH_3-N	NO_3-N	ORG-N	TFE
G12-01	42	5/03/67	--	--	--	--	--	--	--		--	--	--	
G12-01		7/28/67	--	--	--	--	--	--	--		--	--	--	
G12-01		10/18/67	--	--	--	--	--	--	--		--	--	--	
G12-01		1/12/68												
G18-01	73	5/01/67	7.0		--	--	--	--	--	--	--	--	--	
G18-01	74	7/28/67	5.2		10.0	0.8	--	71.3	7.1	--	0.64	0.0037	3.21	40.26
G18-01	72	10/19/67	6.9		13.5	1.1	0.7	48.2	7.4	0.77	0.43	0.0014	1.92	
G18-01	73	1/13/68	7.4	466	2.1	1.5	0.6	74.5	8.4	0.71	0.34	0.0032	2.96	42.87
H20-01	79	5/01/67	7.5		6.0	--	--	--	--		--	--	--	
H20-01	81	7/28/67	5.1		10.0	2.8	--	81.9	8.4		0.57	0.0021	4.02	36.38
H20-01	78	10/19/67	7.0		13.5	1.3	0.9	75.9	8.7	0.78	0.58	0.0026	2.59	
H20-01														
I23-01	80	5/01/67	7.2		--	--	--	--	--		--	--	--	
I23-01	82	7/29/67	7.4		10.0	2.5	--	70.7	6.7		0.55	0.0033	3.23	78.83
I23-01	80	10/19/67	7.0		13.5	1.2	0.8	64.4	8.0	0.90	0.47	0.0039	2.00	
I23-01														
J25-01	77	5/01/67	7.8		5.5	--	--	--	--	--	--	--	--	
J25-01	80	7/29/67	7.2		9.0	--	--	70.8	7.8	--	0.44	0.0014	3.06	36.04
J25-01	78	10/20/67	7.9		13.0	1.5	0.7	64.9	9.0	0.79	0.52	0.0012	2.30	
J25-01														
K28-01	75	4/30/67	7.1		--	--	--	--	--	--	--	--	--	
K28-01	76	7/29/67	7.1		9.0	1.4	--	41.5	4.6	--	0.22	0.0021	1.79	28.25
K28-01	74	10/20/67	6.9		13.0	0.8	0.3	40.0	6.4	0.74	0.24	0.0008	1.34	
K28-01														

TABLE 6 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE SEDIMENT CHEMISTRY

STA. NO.	D	DATE	pH	Eh	T	BOD_5	IDOD	COD	%VS	TP	NH_3-N	NO_3-N	ORG-N	TFE
L30-01	72	4/30/67	8.0		6.0	--	--	--	--	--	--	--	--	
L30-01	74	7/29/67	6.8		10.0	0.4	--	17.4	2.5-	--	0.09	0.0000	0.70	16.74
L30-01	72	10/20/67	7.2		13.0	0.5	0	17.2	5.1	0.84	0.10	0.0016	0.51	
L30-01														
L33-01	70	4/30/67	7.5		--	--	--	--	--	--	--	--	--	
L33-01		7/29/67	--		--	--	--	--	--	--	--	--	--	
L33-01	68	10/22/67	7.2		12.5	0.4	0.1	18.4	2.7	0.67	0.08	0.0002	0.49	
L33-01														
L36-01	70	4/30/67	--		--	--	--	--	--	--	--	--	--	
L36-01		7/29/67	--		--	--	--	--	--	--	--	--	--	
L36-01	70	10/22/67			0.1	0.1	0	9.8	9.3	0.42	0.03	0.0003		
L36-01														
M38-01	74	4/30/67	8.2		4.0	--	--	--	--	--	--	--	--	
M38-01	74	7/30/67	--		--	0.03	--	9.6	1.7	--	0.04	0.0009	0.33	24.70
M38-01	63	10/22/67				0.2	0	6.2	3.3	0.56	0.04	0.0001	0.09	
M38-01														
M41-01	116	4/30/67	7.7		5.5	--	--		--	--	--	--	--	
M41-01	114	7/30/67	7.0		6.0	0	--	18.5	5.7	--	0.04	0.0005	0.03	28.50
M41-01	116	10/22/67	7.4		7.0	0.05	0.05	15.8	7.2	0.76	0.09	0.0006	0.31	
M41-01														
M43-01	144	8/20/67	7.7		--	--	--	--	--	--	--	--	--	
M43-01	140	7/30/67	7.2		4.8	2.2	--	48.2	5.8	--	0.30	0.0005	2.04	38.41
M43-01	140	10/22/67	7.4		6.0	0.2	0.6	53.7	9.8	0.91	0.32	0.0007	1.66	
M43-01														

TABLE 6 (concluded)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE SEDIMENT CHEMISTRY

STA. NO.	D	DATE	pH	Eh	T	BOD_5	IDOD	COD	%VS	TP	NH_3-N	NO_3-N	ORG-N	TFE
N45-01	162	4/29/67	7.4		4.0	--	--	--	--	--	--	--	--	
N45-01	164	7/30/67	7.0		4.8	--	--	63.3	7.0	--	0.45	0.0015	2.31	50.67
N45-01	158	10/23/67	7.3		5.5	1.5	0.9	55.2	11.2	1.10	0.34	0.0007	0.90	
N45-01														
O47-01	159	4/29/67	7.5		4.0	--	--	--	--	--	--	--	--	
O47-01	178	7/30/67	6.8		4.6	4.2	--	74.8	8.0	--	0.71	0.0027	3.89	40.88
O47-01	182	10/23/67	7.2		5.5	1.7	0.7	79.8	8.8	1.49	0.55	0.0016	2.35	
O47-01														
P49-01	98	4/29/67	7.4		5.5	--	--	--	--	--	--	--	--	
P49-01	101	7/30/67	7.5		6.0	0.6	--	18.7	2.4	--	0.08	0.0007	0.83	17.55
P49-01	96	10/23/67	7.3		13.5	2.2	0.5	61.8	6.9	0.75	0.40	0.0009	1.63	
P49-01														
Q51-01	74	4/29/67	7.7		5.0	--	--	--	--	--	--	--	--	
Q51-01	76	7/30/67	9.1		10.5	2.7	--	62.2	5.2	--	0.39	0.0007	2.26	38.39
Q51-01	73	10/23/67	7.6		13.5	0.4	0.8	14.8	2.4	0.83	0.10	0.0002	0.40	
Q51-01														
R53-01	64	4/29/67	7.1		5.0	--	--	--	--	--	--	--	--	
R53-01	64	7/30/67	7.2		17.8	1.1	--	40.4	3.9	--	0.20	0.0017	1.44	24.60
R53-01	62.5	10/23/67	7.1		12.9	0.8	0.1	26.2	2.5	0.76	0.19	0.0005	0.68	
R53-01														
S55-01	42	4/29/67	6.8		6.0	--	--	--	--	--	--	--	--	
S55-01		7/30/67	--		--	--	--	--	--	--	--	--	--	
S55-01	42	10/23/67	7.5		17.5	1.0	0.1	37.2	3.0	0.68	0.25	0.0003	0.87	
S55-01														

TABLE 7

SEDIMENT CHEMISTRY COMPARISONS 1963-64 - 1967-68
mg/g
(Cleveland Program Office Data)

		Western Basin			%	Central Basin			%	Eastern Basin			%
		max.	min.	avg.	Change	max.	min.	avg.	Change	max.	min.	avg.	Change
pH	1963-64	--	--	--		--	--	--		--	--	--	
	1967-68	7.8	6.6	7.0		8.2	6.5	7.2		8.1	7.1	7.4	
BOD	1963-64	--	--	--		--	--	--		--	--	--	
	1967-68	2.9	0.9	1.6		2.0	0.1	1.0		3.1	1.0	1.9	
IDOD	1963-64	--	--	--		--	--	--		--	--	--	
	1967-68	0.8	0.3	0.5		0.9	0.0	0.4		0.9	0.1	0.5	
COD	1963-64	96.0	6.0	63.5		91.0	3.0	55.7		79.0	1.0	27.8	
	1967-68	85.8	39.2	66.1	+4.1	78.9	7.9	41.0	-26.4	77.0	33.3	48.1	+73.0
Volatile Solids	1963-64	543.0	17.0	234.0		748.0	12.0	214.0		301.0	6.0	74.0	
	1967-68	100.0	55.0	81.0	-65.3	93.0	25.0	63.0	-70.6	91.0	30.0	57.0	-23.0
Total Phosphorus	1963-64	1.10	0.29	0.76		1.10	0.13	0.65		1.05	0.12	0.51	
	1967-68	2.19	0.49	0.94	+23.7	0.90	0.42	0.72	+10.8	1.49	0.68	0.93	+82.3
Ammonia Nitrogen	1963-64	0.37	0.04	0.19		0.22	0.00	0.09		0.28	0.00	0.07	
	1967-68	0.53	0.17	0.32	+40.6	0.57	0.03	0.25	+177.8	0.63	0.19	0.32	+357.1
Nitrate Nitrogen	1963-64	.0020	.0000	.0010		.0080	.0000	.0020		.0100	.0000	.0040	
	1967-68	.0024	.0006	.0010	0.0	.0036	.0002	.0014	-30.0	.0022	.0003	.0009	-77.5
Organic Nitrogen	1963-64	0.41	0.05	0.23		9.05	0.08	1.84		2.41	0.00	0.85	
	1967-68	2.85	0.83	1.93	+752.0	3.31	0.17	1.56	-15.2	3.12	0.87	1.58	+85.9
Total Iron	1963-64	68.00	17.00	33.00		72.00	12.00	35.00		45.00	0.02	14.40	
	1967-68	41.56	25.00	32.35	-5.0	78.83	16.74	35.53	+1.5	50.67	17.55	35.08	+143.6

The volatile solids were extremely high during the 1963-64 sampling period indicating the probability of error.

WATER BIOLOGY

PHYTOPLANKTON

Phytoplankton productivity in Lake Erie is highly variable from year to year. The variations result from many factors including nutrient concentration, light intensity, turbidity, and period of sampling (organisms may be in a logarithmic growth stage during sampling period). Since the variables are many, comparison with 1963-64 data will only superficially be made. The 1967 data (see Table 8) will be treated generally to show ranges and to illustrate seasonal variations in productivity and species composition. Only Cleveland Program Office data are available; the Detroit Program Office made no biological evaluations.

The phytoplankton data were averaged for all stations and separated according to basins and seasons. Table 9 illustrates phytoplankton types as related to total phytoplankton for each basin and season.

The data show a spring pulse in the western basin composed primarily of diatoms. Another western basin pulse occurred in fall, primarily of diatoms and green algae. Low-level diatom pulses occurred in spring in the eastern basin, and in summer and winter in the western basin. In each case the dominant diatoms were of the Cyclotella-Stephanodiscus variety. Scenedesmus was the dominant green alga. Table 10 shows average total populations and algal types with reference to basin and season.

The decreasing west to east trend is not as obvious in the 1967-68 data as it was in 1963-64 especially when considering the averages. However, upon further examination of the individual types and numbers, the trend is discernible especially in spring, summer, and fall.

Table 11 shows slightly higher spring 1967 average phytoplankton numbers in the western and eastern basins than in 1963-64. Lower numbers were noted in the central basin in 1967-68. Higher numbers of phytoplankton were noted in the western and central basins in the fall of 1967 than in the fall of 1964. Fall, eastern basin average phytoplankton numbers were similar during both sampling periods.

The fall 1963-64 plankton populations indicate bloom conditions in the western basin, whereas this state of algal productivity was not encountered anywhere during the 1967-68 sampling period. However, conclusions with respect to changes in Lake Erie algal productivity cannot be made without more frequent sampling.

TABLE 8

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
D09-01	0	5/03/67	330	22	242		3124	242	22	--	3982	24	3600
D09-01	0	7/28/67	11	--	407		330	22	--	66	836	28	6000
D09-01	0	10/18/67	--	22	374		924	44	--	--	1364	33	1600
D09-01	0												
D09-01	22	5/03/67	132	44	242		3190	374		22	4004	26	2800
D09-01	32	7/28/67	55	33	110		319	22		22	561	30	4700
D09-01	23	10/18/67	66	22	616		1100	88		--	1892	32	2200
D09-01													
D09-01	42	5/03/67	110	44	352		3762	682	--	44	4994	29	4000
D09-01	62	7/28/67	77	33	187		341	44	77	66	825	31	7500
D09-01	42	10/18/67	66	22	528		1012	22		--	1650	24	1000
D09-01													
D13-01	0	5/02/67	506	22	198		132	44	--	--	902	6	1200
D13-01	0	7/28/67	11	11	44		11	--	88	187	352	20	1900
D13-01	0	10/18/67	--	--	484		88	44	--	--	616	19	2300
D13-01	0	1/12/68	22	11	165		99	154	--	33	484	12	1000
D13-01	23	5/02/67	132	--	198	--	132	22	--	--	484	8	1300
D13-01	36	7/28/67	--	11	33	33	--	11	22	55	165	6	1100
D13-01	23	10/18/67	--	44	550	22	110	110	--	--	836	20	2000
D13-01	23	1/12/68	22	11	176	11	231	253	55	33	792	15	200
D13-01	44	5/02/67	616	66	198	--	88	44	--	--	1012	6	4700
D13-01	47	7/28/67	22	--	33	11	110	66	--	--	242	18	1000
D13-01	42	10/18/67		--	704	--	154	110	--	--	968	20	3000
D13-01	44	1/12/68			330	11	220	209	22	44	836	13	880

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
E02-01	0	5/04/67	176	44	220		2046	374	--	--	2860	49	6900
E02-01	0	7/26/67	198	1320	198		--	66	--	22	1804	14	7100
E02-01	0	10/16/67	22	1100	3758		3476	176	22		8554	73	7700
E02-01	0	1/09/68			66		286	55			407	39	1400
E02-01	14	5/04/67	66	--	484	--	2728	396	22	22	3718	55	6300
E02-01	15	7/26/67	110	1452	220	22	176	132	--		2112	34	3800
E02-01	17	10/16/67	132	572	3564	--	4620	748	88		9724	55	6900
E02-01													
E02-01	26	5/04/67	44	44	418	--	3674	374	66		4620	69	9700
E02-01	29	7/26/67	110	1332	352	--	242	66	--		2102	40	--
E02-01	29	10/16/67	88	220	2376	44	4048	1144	176		8096	130	31400
E02-01	29	1/09/68					132	55			187	55	12000
E05-01	0	5/04/67	44	--	110		2068	484	--	--	2706	53	3700
E05-01	0	7/27/67	22	--	77		88	44	--	88	319	19	3500
E05-01	0	10/17/67	22	44	572		902	22	110		1672	21	300
E05-01	0	1/10/68	11		22		330	286	11		660	7	300
E05-01	12	5/04/67	110	22	88		1804	330	22	--	2376	51	1300
E05-01	13	7/27/67	11	22	22		55	--		44	154	15	4300
E05-01	12	10/17/67	88	44	308		220	--		--	660	18	4500
E05-01	13	1/10/68		33	33		561	231		11	869	14	600
E05-01	22	5/04/67	110	22	132		1540	286		22	2112	50	1500
E05-01	24	7/27/67	22	22	22		88	11		33	198	19	2600
E05-01	21	10/17/67	22	11	165		451	--			649	16	4000
E05-01	23	1/10/68			88		550	330			968	8	400

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
F03-01	0	5/04/67	44	44	66		1738	286	22	132	2332	44	4800
F03-01	0	7/26/67	110	154	132		264	22	--	22	704	19	3300
F03-01	0	10/16/67	440	616	2376		1012	176	44		4664	22	5700
F03-01	0	1/09/68		11	77		1210	231	11		1540	18	2000
F03-01	16	5/04/67	66	22	242		1430	286		22	2068	47	4400
F03-01	17	7/26/67	88	220	44		374	44		154	824	22	6700
F03-01	17	10/16/67	352	484	1892		1232-	220			4180	15	6000
F03-01	16	1/09/68			154		1155	187			1518	17	5000
F03-01	30	5/04/67	44	22	242	--	2090	154	--	66	2618	51	4800
F03-01	32	7/26/67	--	110	242	--	220	110	--	110	892	15	6000
F03-01	29	10/16/67	220	1100	3036	132	1760	352	88	--	6688	94	11300
F03-01	30	1/09/68			66		1386	253		11	1716	24	1000
F03-02	0	5/04/67	264	22	682	--	2288	264		--	3520	51	3200
F03-02	0	7/27/67	22	66	88	22	66	22		22	308	16	4200
F03-02	0	10/17/67	--	22	902	22	1518	154			2618	24	2300
F03-02	0	1/09/68		22	110		737	286			1210	8	800
F03-02	13	5/04/67	88	--	132		1474	264	--	--	1958	53	2500
F03-02	12	7/27/67	--	22	44		176	66	--	22	330	14	300
F03-02	12	10/17/67	33	11	187		231	--	11		473	16	2000
F03-02	16	1/09/68	11	11	33		341	297	11		704	16	1600
F03-02	24	5/04/67	88	--	154		1298	330		--	1870	51	4000
F03-02	23	7/27/67	22	66	88		242	44		44	506	19	1900
F03-02	20	10/17/67	88	22	1034		990	132		--	2266	21	2000
F03-02	29	1/09/68	11		55		407	264		22	759	20	1600

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

			BLUE GREEN		GREEN		DIATOMS		FLAGELLATES		TOTAL	CHLORO	SESTON
STA. NO.	D	DATE	Coccoid	Filament	Coccoid	Filament	Centric	Pennate	Green	Brown	No/ml	mg/M^3	mg/M^3
F16-01	0	5/02/67	154	--	176	--	286	44	--	--	660	14	1000
F16-01	0	7/28/67	--	33	88	44	--	11	--	66	242	10	900
F16-01	0	10/18/67	--		198		88	407	--	--	693	18	2200
F16-01	0	1/13/68	55		176		220	253	11	55	770	14	300
F16-01	30	5/02/67	154	--	220	--	176	286		--	836	13	400
F16-01	48	7/28/67	33	--	88	77	11	11		--	220	4	1200
F16-01	30	10/18/67	--	--	187	--	11	99		--	297	18	1000
F16-01	31	1/13/68	11	11	132	11	308	220		22	715	13	300
F16-01	59	5/02/67	132	--	220	--	308	154	--	88	902	12	1400
F16-01	60	7/28/67	11	--	77	66	22	22	22	--	220	3	300
F16-01	56	10/18/67	--	11	198	--	154	143	--	22	528	24	1300
F16-01	60	1/13/68	22		242	11	473	363	11	22	1144	19	100
G04-01	0	5/04/67	22	--	88		2046	440	44		2640	41	3300
G04-01	0	7/27/67	--	44	594	66	1276	132	66		2178	32	3700
G04-01	0	10/17/67	132	154	1782	44	2354	242	44		4752	51	13800
G04-01	0	1/09/68		22	44	--	88	77			231	11	1000
G04-01	14	5/04/67			66		1650	374		--	2090	40	2900
G04-01	15	7/27/67	66	44	638	66	2048	88	88	--	3038	31	4000
G04-01	15	10/17/67	88	66	858	--	2178	220	44	--	3454	50	5500
G04-01	15	1/09/68			77	11	275	77	11	11	462	12	4700
G04-01	26	5/04/67	88	22	66		2816	638		22	3652	37	5100
G04-01	28	7/27/67	44	--	462	44	1034	44	22	--	1650	32	7500
G04-01	26	10/17/67	264	88	2200	88	2464	88	44	--	5236	49	5300
G04-01	26	1/09/68	11		44	11	88	165	11	44	374	19	6700

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M³	SESTON mg/M³
G06-01	0	5/04/67	44	--	44	--	1144	220	--		1452	21	600
G06-01	0	7/27/67	44	154	462	110	1584	44	--		2398	39	6000
G06-01	0	10/17/67		22	176		1254	154	66		1672	13	4300
G06-01	0	1/10/68				11	88	143			162	10	4000
G06-01	16	5/04/67	66	22	22	--	682	286		--	1078	17	4600
G06-01	27	7/27/67	132	44	1320	66	1870	66		--	3498	39	4300
G06-01	16	10/17/67	176		220		1430	44		--	1870	16	3300
G06-01	16	1/10/68			44		99	88		11	242	6	7000
G06-01	30	5/04/67	22		44	--	880	352		22	1320	21	5000
G06-01	32	7/27/67	110		924	22	1518	220		--	2794	34	4000
G06-01	28	10/17/67	22		154	--	462	--		--	638	15	2900
G06-01	29	1/10/68			11	11	165	110		22			3500
G07-01	0	5/03/67	88		66	--	2530	418	--	22	3124	33	4100
G07-01	0	7/27/67	66		308	44	66	66	176		726	14	250
G07-01	0	10/17/67	--		154		682	22			858	13	
G07-01	0	1/10/68	22		66		99	66			253	13	5000
G07-01	25	5/03/67	88		220	--	3278	484	--	22	4092	25	2500
G07-01	18	7/27/67	22		308	--	55	66	220		671	13	1800
G07-01	17	10/17/67	--		154	--	264	22			440	15	900
G07-01	17	1/10/68	11		44	11	165	44			275	17	1300
G07-01	47	5/03/67	110	88	88		2486	374	--	22	3168	31	4700
G07-01	34	7/27/67	11	22	231		33	55	176		528	13	1800
G07-01	30	10/17/67			176		594	--	22		792	14	1100
G07-01	32	1/10/68					121	88			209	8	6700

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
G09-01	0	5/03/67	132		110	--	308	44		110	704	12	1900
G09-01	0	7/27/67	33		99	11	11	11		--	165	5	400
G09-01	0	10/18/67	66		132		308	110		--	616	12	300
G09-01	0	1/11/68	22		22		132	242		22	440	10	1200
G09-01	18	5/03/67	22	--	66	--	572	66		88	814	9	3600
G09-01	18	7/27/67		--	--	--	--	--			--	6	800
G09-01	18	10/18/67		22	154	--	396	44			616	11	300
G09-01	19	1/11/68			33	11	198	143			385	7	3200
G09-01	35	5/03/67	22	--	22		396	44	--	44	528	12	1900
G09-01	34	7/27/67	11	22	132		308	66	--	22	561	6	1000
G09-01	32	10/18/67	33	--	176		385	77	--	22	693	10	700
G09-01	35	1/11/68		22	11		77	231	11		352	9	1400
G10-01	0	5/03/67	--	--	44		220	22	--	154	440	8	7200
G10-01	0	7/28/67	--	--	44		110	11	--	--	165	8	800
G10-01	0	10/18/67	11	11	319		704	88	--	--	1133	26	500
G10-01	0	1/11/68	11		55		187	264	11	22	550	9	500
G10-01	19	5/03/67	22	--	66		352	22	--	44	506	9	7700
G10-01	18	7/28/67	7	--	37		80	--	--	--	124	9	2700
G10-01	20	10/18/67		22	352		726	66	286	--	1452	13	200
G10-01	19	1/11/68		11	11		242	99	33	11	407	7	500
G10-01	36	5/03/67	--	--	44	--	506	88	--	44	682	12	7200
G10-01	34	7/28/67	11	11	33	--	110	11	--	--	176	9	1300
G10-01	36	10/18/67	55		352	11	825	66	33	22	1364	24	200
G10-01	36	1/11/68	11		33		319	187	11		561	8	700

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
G12-01	0	5/03/67	22		88		154	88	--	220	572	8	4700
G12-01	0	7/28/67	--		33		44	--	11	44	132	4	2600
G12-01	0	10/18/67	66		616		924	--	--	66	1672	24	3200
G12-01	0	1/12/68	11		253		220	154	22	22	682	6	500
G12-01	21	5/03/67	--		110		308	22	--	154	594	12	5100
G12-01	29	7/28/67	6		23		66	--	6	17	118	6	1300
G12-01	20	10/18/67	220		1166		924	44	--	--	2354	32	2700
G12-01	20	1/12/68	22		99		99	110	11	11	352	5	1000
G12-01	40	5/03/67	44	--	--	--	330	88		44	506	9	3800
G12-01	40	7/28/67	--	--	110	11	187	--		--	308	7	2700
G12-01	36	10/18/67	55	44	539	11	517	22		11	1199	35	800
G12-01	38	1/12/68	33		154		231	176		11	605	9	600
G18-01	0	5/01/67	22	22	242		352	--	--	66	704	7	1400
G18-01	0	7/28/67	--	--	121		11	--	--	--	132	2	1200
G18-01	0	10/19/67	77	22	187		77	88	11	11	473	15	600
G18-01	0	1/13/68			132		143	22	44	55	396	7	500
G18-01	36	5/01/67	132		264		330	44	--	66	836	7	1100
G18-01	50	7/28/67	--		68		8	--	8	--	84	1	1800
G18-01	35	10/19/67	--		132		66	187	--	--	385	12	700
G18-01	36	1/13/68	11		88		132	110	33	33	407	6	200
G18-01	71	5/01/67	110		22		198	110	--	--	440	6	2800
G18-01	72	7/28/67	11		121		55	11	11	--	209	3	3500
G18-01	68	10/19/67			121		110	88	11	33	363	14	500
G18-01	70	1/13/68			110		77	33	11	33	264	11	200

TABLE 6 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

			BLUE GREEN		GREEN		DIATOMS		FLAGELLATES		TOTAL	CHLORO	SESTON
STA. NO.	D	DATE	Coccoid	Filament	Coccoid	Filament	Centric	Pennate	Green	Brown	No/ml	mg/M^3	mg/M^3
H20-01	0	5/01/67	22	--	44	--	264	154	--	22	506	15	200
H20-01	0	7/28/67		22	132	66	--	11	22	33	286	4	2200
H20-01	0	10/19/67			110	11	22	418	11	88	660	13	500
H20-01	0												
H20-01	39	5/01/67	44		22	--	110	88	--	66	330	12	100
H20-01	54	7/28/67			154	--	--	--	11	--	165	2	1300
H20-01	39	10/19/67			165	11	22	759		11	968	15	400
H20-01													
H20-01	77	5/01/67	--		66		154	22		22	264	14	200
H20-01	79	7/28/67	--		44		--	11		--	55	7	3300
H20-01	74	10/19/67	66		154		88	1232		44	1584	16	800
H20-01													
123-01	0	5/01/67			22	--	528	132		110	792	12	200
123-01	0	7/29/67			22	121	--	22		77	242	6	1400
123-01	0	10/19/67			176		22	528		66	792	12	700
123-01	0												
123-01	40	5/01/67	88	88	220	--	418	132		132	1078	a	500
123-01	57	7/29/67	--	11	33	66	11	11		22	154	3	700
123-01	40	10/19/67	22		132	11	11	638		11	825	13	800
123-01													
123-01	78	5/01/67	66		44	--	198	44	--	66	418	15	200
123-01	80	7/29/67			22	121	--	33	11	--	187	3	1300
123-01	76	10/19/67			55		44	484	11	66	660	13	900
123-01													

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

			BLUE GREEN		GREEN		DIATOMS		FLAGELLATES		TOTAL	CHLORO	SESTON
STA. NO.	D	DATE	Coccoid	Filament	Coccoid	Filament	Centric	Pennate	Green	Brown	No/ml	mg/M^3	mg/M^3
J25-01	0	5/01/67		--	44	--	176	22		22	264	16	400
J25-01	0	7/29/67		11	66	55	55	66		55	308	5	1200
J25-01	0	10/20/67			88	11	49	99		11	258	10	1100
J25-01	0												
J25-01	38	5/01/67	22	22	22	--	198	66	--	66	396	10	100
J25-01	57	7/29/67	11		33	44	11	55	--	11	165	5	900
J25-01	39	10/20/67	22		99		55	132	22	44	374	13	1300
J25-01													
J25-01	75	5/01/67	22	--	44	--	176	154	--	44	440	10	400
J25-01	78	7/29/67	--	22	99	44	44	44	--	22	275	9	1300
J25-01	74	10/20/67	22		55	11	11	242	11	33	385	12	1400
J25-01													
K28-01	0	4/30/67	22	--	--	--	44	110		154	330	9	500
K28-01	0	7/29/67	33	33	154	33	--	--		--	253	3	400
K28-01	0	10/20/67			66	11	55	143		55	330	12	1000
K28-01	0												
K28-01	37	4/30/67	22	22	--	--	110	44		66	264	6	300
K28-01	57	7/29/67	11	11	154	11	33	22		--	242	1	300
K28-01	37	10/20/67	33		22		77	209		11	352	11	1500
K28-01													
K28-01	73	4/30/67	--	22	110	--	110	44		88	374	7	400
K28-01	74	7/29/67	11	11	55	11	55	66		--	209	3	100
K28-01	70	10/20/67	11		121		33	286		11	462	13	1200
K28-01													

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN		GREEN		DIATOMS		FLAGELLATES		TOTAL	CHLORO	SESTON
			Coccoid	Filament	Coccoid	Filament	Centric	Pennate	Green	Brown	No/ml	mg/M^3	mg/M^3
L30-01	0	4/30/67	--	--	--	--	66	22		44	132	3	1700
L30-01	0	7/29/67	22	374	--	44	--	176		--	616	2	600
L30-01	0	10/20/67			88	11	11	165		11	286	11	600
L30-01	0												
L30-01	35	4/30/67	66		--	--	44	44	--	22	176	7	2100
L30-01	56	7/29/67	33		231	22	--	22	--	--	308	1	--
L30-01	36	10/20/67	11		88		22	220	33	66	440	9	600
L30-01													
L30-01	70	4/30/67	44		22	--	132	44		44	286	6	2400
L30-01	72	7/29/67			110	22	--	11		11	154	3	600
L30-01	68	10/20/67			110	11	33	330		22	506	11	400
L30-01													
L33-01	0	4/30/67	66	--	--	--	88	44	--	44	242	5	1500
L33-01	0	7/29/67	--	11	44	55	--	22	33	33	198	3	2200
L33-01	0	10/22/67	6		123		17	39	28		213	10	1900
L33-01	0												
L33-01	35	4/30/67	66	--	44	--	66	44	--	110	330	7	1400
L33-01	52	7/29/67	11	--	66	44	--	22	--	11	154	3	2300
L33-01	34	10/22/67	6	6	145		12	101	17	12	299	11	1700
L33-01													
L33-01	68	4/30/67	44	22	22	--	66	22	--	44	220	4	2200
L33-01	69	7/29/67		--	44	44	11	66	22	--	187	4	6200
L33-01	64	10/22/67		11	154		22	55	22	22	286	14	1500
L33-01													

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D.	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
L36-01	0	4/30/67	22	--	22	--	154	22	--	132	352	4	200
L36-01	0	7/29/67	11	33	66	121	22	--	--		253	2	1000
L36-01	0	10/22/67		22	242	11	11	66	22		374	10	1600
L36-01	0												
L36-01	35	4/30/67	--	44	--	--	154	22	--	110	330	7	200
L36-01	53	7/29/67	11	11	99	55	--	11	33	22	242	2	1700
L36-01	35	10/22/67			242	22	22	55	44	11	396	6	1200
L36-01													
L36-01	68	4/30/67	22		--	--	176	22	--	66	286	6	200
L36-01	67	7/29/67	11		44	77	22	22	11	--	187	1	1900
L36-01	66	10/22/67			231	33	11	55		11	341	7	1300
L36-01													
M38-01	0	4/30/67	44	--	88	--	132	44	--		308	6	1600
M38-01	0	7/30/67	968	506	154	--	--	88	--		1716	2	1100
M38-01	0	10/22/67	6		112	11	6	72	6		213	8	1000
M38-01	0												
M38-01	36	4/30/67	22	--	44	--	--	66		--	132	4	1300
M38-01	54	7/30/67	462	352	198	44	44	44		22	1166	2	1700
M38-01	31	10/22/67			85	22	6	34		12	159	6	1100
M38-01													
M38-01	72	4/30/67	22	--	22	--	66	66	--		176	7	1400
M38-01	72	7/30/67	132	66	198	66			132		594	2	1000
M38-01	59	10/22/67			77	33		231			341	6	4600
M38-01													

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN		GREEN		DIATOMS		FLAGELLATES		TOTAL	CHLORO	SESTON
			Coccoid	Filament	Coccoid	Filament	Centric	Pennate	Green	Brown	No/ml	mg/M^3	mg/M^3
M41-01	0	4/30/67	44	--	22	--	132	132	--	22	352	5	1600
M41-01	0	7/30/67	550	1232	286	66	66	22	22		2244	2	1800
M41-01	0	10/22/67	33		121	11	11	33			209	7	1000
M41-01	0												
M41-01	58	4/30/67	--	--	88	--	176	--	--	22	286	3	800
M41-01	50	7/30/67	374	88	198	22		22	66		770	2	2200
M41-01	58	10/22/67	11		99	22		88			220	7	500
M41-01													
M41-01	114	4/30/67	--	--	--	--	132	22			154	5	2500
M41-01	112	7/30/67	220	66	22	22	--	--			330	1	2600
M41-01	112	10/22/67	11		56	17	11	55			150	4	1300
M41-01													
M43-01	0	4/30/67	--		--	--	198	22		--	220	4	100
M43-01	0	7/30/67	1870		154	--	44	--		--	2068	2	2000
M43-01	0	10/22/67			73	6		39		17	135	9	1000
M43-01	0												
M43-01	72	4/30/67	--	--	--	--	132	22	--	22	176	4	1200
M43-01	50	7/30/67	374	88	44	--	--	44	110	22	682	4	2000
M43-01	110	10/22/67			44	11	11	99	11	11	187	4	900
M43-01													
M43-01	142	4/30/67	66	--	22		66	66	--	22	242	4	1300
M43-01	138	7/30/67	198	44	22		--	--	66		330	1	2400
M43-01	136	10/22/67			33		44	33			110	3	1000
M43-01													

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M3	SESTON mg/M3
N45-01	0	4/29/67		--	--	--	44	22	--	66	132	3	800
N45-01	0	7/30/67		--	154	--	33	22	--	--	209	2	1100
N45-01	0	10/23/67		6	35	6	11	78	6	23	165	7	200
N45-01	0												
N45-01	80	4/29/67	66	--	44	--	22	66		22	220	3	500
N45-01	40	7/30/67	77	22	187	--	22	22		11	341	2	500
N45-01	120	10/23/67			23	11		17			51	4	200
N45-01													
N45-01	160	4/29/67	44		66		154	110		44	418	3	2100
N45-01	160	7/30/67	22		22		77	11			132	1	400
N45-01	154	10/23/67			12		6	22			40	3	400
N45-01													
047-01	0	4/29/67	--		--	--	88	22		--	110	0	200
047-01	0	7/30/67	22		132	33	11	33		22	253	3	2200
047-01	0	10/23/67			6	6		23		18	53	5	200
047-01	0												
047-01	79	4/29/67			--	--	88	22	--	22	132	3	100
047-01	55	7/30/67			54	30	8	8	120	--	220	2	2200
047-01	130	10/23/67			40	6	17	122	6	6	197	4	300
047-01													
047-01	157	4/29/67	22		22	--	22	22			88	3	200
047-01	175	7/30/67	--		--	--	--	--			--	1	2100
047-01	177	10/23/67	11		45	6	17	84			163	5	800
047-01													

TABLE 8 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN		GREEN		DIATOMS		FLAGELLATES		TOTAL	CHLORO	SESTON
			Coccoid	Filament	Coccoid	Filament	Centric	Pennate	Green	Brown	No/ml	mg/M^3	mg/M^3
P49-01	0	4/29/67	44	--	154	--	330	132		--	660	5	100
P49-01	0	7/30/67	11	44	66	33	11	33		11	209	2	3000
P49-01	0	10/23/67	66		198			88		33	385	10	500
P49-01	0												
P49-01	49	4/29/67	44		66		374	154	--	66	704	7	500
P49-01	60	7/30/67	15		31		23	8	45	8	130	1	1800
P49-01	48	10/23/67			33			99		33	165	8	300
P49-01													
P49-01	96	4/29/67		--	66		110	44		44	264	7	300
P49-01	99	7/30/67		22	44		220	22			308	1	--
P49-01	92	10/23/67			17		11	122			150	7	600
P49-01													
Q51-01	0	4/29/67	154	--	66	--	419	88		66	793	10	500
Q51-01	0	7/30/67	23	8	46	15	8	--		15	115	2	800
Q51-01	0	10/23/67			56	11	6	77			150	7	400
Q51-01	0												
Q51-01	37	4/29/67	44		88	--	308	110		--	550	7	900
Q51-01	64	7/30/67			54	8	--	--		8	70	1	800
Q51-01	36	10/23/67			39		11	78		6	134	11	500
Q51-01													
Q51-01	72	4/29/67	44	22	132	--	110	110		22	440	7	400
Q51-01	74	7/30/67		--	31	--	23	--		--	54	1	--
Q51-01	69	10/23/67		6	233	6	17	127		6	185	7	300
Q51-01													

TABLE 8 (concluded)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE PLANKTON

STA. NO.	D	DATE	BLUE GREEN Coccoid	BLUE GREEN Filament	GREEN Coccoid	GREEN Filament	DIATOMS Centric	DIATOMS Pennate	FLAGELLATES Green	FLAGELLATES Brown	TOTAL No/ml	CHLORO mg/M^3	SESTON mg/M^3
R53-01	0	4/29/67	154	--	220	--	352	22	--	22	770	8	200
R53-01	0	7/30/67	33	33	66	22	11	--	--	11	176	2	900
R53-01	0	10/23/67			68		6	122	6	6	208	9	700
R53-01	0												
R53-01	32	4/29/67	176	--	154	--	418	66	--	--	814	9	200
R53-01	32	7/30/67	23	--	46	15	--	15	31	23	153	2	300
R53-01	31	10/23/67		6	80	22	34	166	17	6	331	9	900
R53-01													
R53-01	62	4/29/67	110		132	--	286	88	--	22	638	9	700
R53-01	62	7/30/67			11	16	--	--	11	22	60	2	1100
R53-01	59	10/23/67			91		6	161	6	6	270	8	400
R53-01													
S55-01	0	4/29/67	44		154		2002	154	--	110	2464	17	1100
S55-01	0	7/30/67	6		34		--	6	--	28	74	2	100
S55-01	0	10/23/67	6		50		11	133	6		206	14	400
S55-01	0												
S55-01	21	4/29/67	22	--	110	--	1914	242	--	132	2420	23	1100
S55-01	21	7/30/67	11	6	12	--	--	--	12	17	58	2	200
S55-01	21	10/23/67	11		73	12	6	220		6	328	13	200
S55-01													
S55-01	40	4/29/67	88	--	66	--	1870	484		22	2530	23	2400
S55-01	40	7/30/67	30	15	46	23	--	8		23	145	2	300
S55-01	38	10/23/67			45	6	11	123			185	12	200
S55-01													

TABLE 9

PERCENT PHYTOPLANKTON TYPES vs. TOTAL ORGANISMS
(Cleveland Program Office Data)

Basin	Spring	Summer	Fall	Winter	Annual
		DIATOMS vs. TOTAL NUMBER OF ORGANISMS			
Western	87.0	47.4	52.9	85.8	66.9
Central	51.7	14.7	56.3	60.6*	46.5
Eastern	76.9	9.1	56.1		52.5
		BLUE-GREENS vs. TOTAL NUMBER OF ORGANISMS			
Western	4.0	20.8	8.8	1.8	8.4
Central	19.8	32.8	2.4	3.0*	14.5
Eastern	7.6	60.6	3.8		23.7
		GREENS vs. TOTAL NUMBER OF ORGANISMS			
Western	6.9	26.8	36.9	10.2	22.6
Central	17.4	42.2	35.7	27.5*	30.2
Eastern	10.7	22.7	34.7		18.1
		FLAGELLATES vs. TOTAL NUMBER OF ORGANISMS			
Western	2.1	5.0	1.4	2.2	2.3
Central	11.1	10.3	5.5	8.9*	8.8
Eastern	4.8	7.6	5.4		5.8

* 3 stations sampled out of total of 11 stations

TABLE 10

AVERAGE PHYTOPLANKTON POPULATIONS
Organisms per ml
(Cleveland Program Office Data)

Type of Algae	Season	Basin		
		Western	Central	Eastern
Diatom	Spring	1943	238	500
Blue-Green	Spring	91	91	50
Green	Spring	152	81	70
Flagellate	Spring	47	51	31
Total	Spring	2233	461	651
Diatom	Summer	468	45	35
Blue-Green	Summer	207	101	230
Green	Summer	265	137	86
Flagellate	Summer	52	32	29
Total	Summer	992	315	380
Diatom	Fall	1378	284	102
Blue-Green	Fall	229	12	7
Green	Fall	960	180	63
Flagellate	Fall	36	28	10
Total	Fall	2603	504	182
Diatom	Winter	514	391*	--
Blue-Green	Winter	11	20*	--
Green	Winter	61	177*	--
Flagellate	Winter	16	58*	--
Total	Winter	602	646*	--

* 3 station average

TABLE 11

WATER BIOLOGY COMPARISONS
Average numbers of Organisms per ml
(Cleveland Program Office Data)

Season		Basin		
		Western	Central	Eastern
Spring	1963-64	1805	1170	575
	1967-68	2233	461	651
Fall	1963-64	10,800	1005	180
	1967-68	2603	504	182

CHLOROPHYLL AND SESTON

To supplement phytoplankton data chlorophyll and seston analyses were instituted for the Cleveland Program Office 1967-68 study, (see Table 8). Chlorophyll is an enzyme present in green plants. In the presence of light, through photosynthesis, chlorophyll converts water and carbon dioxide to sugar, a substance basic to plant metabolism and reproduction. As a result chlorophyll is closely related to primary production or the conversion of inorganic materials to living plant tissue. Chlorophyll determinations are used to give an estimate of phytoplankton productivity since the amount of chlorophyll present is an indicator of the type algae present. Coccoid and filamentous green algae contain chlorophyll a and b. Diatoms and brown flagellates contain chlorophyll a and c but lack chlorophyll b. Blue-green algae contain only chlorophyll a.

Organic seston includes the living phytoplankton and zooplankton, and the non-living particles of organic matter floating or held in suspension in the water. It provides a gross estimate of algal productivity by assuming that most of the mid-Lake Erie suspended organic matter is derived from algal sources. However, in some instances this may not be true, and significant contamination with non-living organic debris (tripton) is a probability. The results of Lake Erie 1967-68 chlorophyll and seston determinations are summarized in Table 8.

SEDIMENT BIOLOGY

Benthic fauna are macroscopic organisms which live on or within lake bottom sediments. Some have been classified, rather nonprecisely,

as "pollution-tolerant" or "pollution-sensitive". Characteristic of a clean water zone is the presence of many kinds of bottom organisms. Typical clean water species are immature caddis flies (Tricoptera), stoneflies (Plecoptera), mayflies (Ephemeroptera), dobson flies (Megaloptera), gill-breathing snails (Prosobranchia), scuds (Amphipoda) and pearl button clams (Unionidae). Although the variety of organisms is great, the total population is small, because of predation and competition for food.

In a polluted zone only a few kinds of organisms can survive in the soft, shifting, bottom organic sludge blanket. Such organisms, isolated from predators, reproduce to huge populations. These include sludgeworms (Oligochaetea), some kinds of bloodworms (Chironomidae), sowbugs (Isopoda), lung-breathing snails (Pulmonata), various leeches (Hirudinea) and the fingernail clam (Sphaeriidae).

The results of bottom fauna surveys of Lake Erie in 1967-68 by the Cleveland Program Office are summarized in Table 12. The pollution-sensitive scud is found only in small numbers in the western basin, increasing in quantity in the central basin, and reaching a high in the west end of the eastern basin, only to decrease sharply in the extreme east portion of the lake. The more pollution-tolerant sludgeworms, bloodworms, fingernail clams and nematodes are prevalent throughout the entire lake.

WATER BACTERIOLOGY

Bacterial densities in Lake Erie under ice cover have never been determined on a lake-wide basis. Towards this end, samples were collected at two depths (top and bottom) in January 1968 for the following parameters: Standard Plate Count, 20°C, Standard Plate Count, 35°C, and total coliforms. As mentioned previously, this cruise was only completed in the western basin with partial sampling in the central basin. The results are summarized in Table 13.

Under ice conditions rather large bacterial populations were found in western basin bottom waters. In 1963-64 during non-winter sampling, larger bacterial populations were found in western basin surface waters. The three stations sampled in winter in the central basin were for all practical purposes free of coliform organisms. In the western basin the sampling stations closest to Toledo and Detroit demonstrated the highest bacterial densities. Coliforms ranged from a high of 1,350 per 100 ml to less than one per 100 ml.

TABLE 12

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE BENTHIC MACROINVERTEBRATES

STA. NO.	D	DATE	Am	Is	Pr	Pu	Hl	Ol	Ne	Tu	Un	Sp	Ch	Ep	Tr	Ot	TOTAL
D09-01	44	5/03/67		--	--			1340	82			33	409				1864
D09-01	64	7/28/67		38	5			485	5			5	98				636
D09-01	46	10/18/67						605	87			11	87				790
D09-01																	
D13-01	46	5/02/67		--				387	87			202	354			125	1155
D13-01	49	7/28/67		--				87	142			65	82				376
D13-01	46	10/18/67		38				1384	229			512	305				2468
D13-01	47	1/12/68		16	60			1705	120			512	245				2658
E02-01	28	5/04/67	--				6	447	327				--				780
E02-01	31	7/26/67	--				--	3272					387				3659
E02-01	34	10/16/67	11				65	9286					97				9459
E02-01	32	1/09/68	5				16	768					44				833
E05-01	24	5/04/67	27		--		22	501	55			142	1199				1946
E05-01	26	7/28/67			--		16	578	71			38	349				1052
E05-01	25	10/17/67			--		16	4289				158	615				5737
E05-01	26	1/10/68			5		11	686	131			65	300				1198
F03-01	33	5/04/67	x				x	x	--	--		x	--				--
F03-01	34	7/26/67					990	13,302	--	--		1635	--				15,927
F03-01	32	10/16/67					118	7371	54	11		742	721				9017
F03-01	33	1/10/68					16	474		49			32				571
F03-02	26	5/04/67	--		--		6	878	--			87	452				1423
F03-02	25	7/27/67	--		--		--	1570	22			87	103				1782
F03-02	25	10/17/67	33		5		42	2360	65			174	262				2941
F03-02	32	1/09/68					10	2638				11	60				2719

TABLE 12 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE BENTHIC MACROINVERTEBRATES

STA. NO.	D	DATE	Am	Is	Pr	Pu	Hi	Ol	Ne	Tu	Un	Sp	Ch	Ep	Tr	Ot	TOTAL
F16-01	61	5/02/67						311	507			392	136			11	1357
F16-01	62	7/28/67						114	136			71	33				354
F16-01	60	10/18/67						425	283			1994	98				2800
F16-01	63	1/13/68						436	529			954	76				1995
G04-01	28	5/4/67	--		38		66	229	--		--	38	49		--	--	420
G04-01	30	7/27/67	87		82		54	687	5		--	371	289		5	--	1580
G04-01	30.5	10/17/67	16		--		156	4959	5		5	153	38		--	--	5332
G04-01	29	1/09/68			16		147	8486	5		5	82	365		--	27	
G06-01	32	5/04/67	--		11	--	11	109	49		--	16	164				360
G06-01	34	7/27/67	--		16	--	21	64	--		10	103	114				328
G06-01	32	10/17/67	5		--	92	48	2305	93		5	120	93				2761
G06-01	32	1/10/68	109		142	5	38	2807	16		16	272	114			141	3660
G07-01	49	5/03/67	--		--		--	452	--		--	49	164				665
G07-01	36	7/27/67	--		11		5	561	441		5	169	567				1759
G07-01	34	10/17/67	16				5	1760	289		5	120	185				2380
G07-01	35	1/10/68						1330	251			16	33				1630
G09-01	37	5/03/67	--		6		11	403	262		--	71	202				955
G09-01	36	7/27/67	--		5			256	76		10	71	283				701
G09-01	36	10/17/67	11		5			828	480		5	245	153				1727
G09-01	38	1/11/68			16		22	665	238			121	142			16	1230
G10-01	38	5/03/67	--	--	--		60	409	--		--	--	153				622
G10-01	36	7/28/67	16	16	--		11	638	16		10	22	223				952
G10-01	40	10/18/67	--	--	--		37	289	32		5	44	71				478
G10-01	39	1/11/68	60	33	16		125	2180	103		10	131	387			5	3020

TABLE 12 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE BENTHIC MACROINVERTEBRATES

STA. NO.	D	DATE	Am	Is	Pr	Pu	Hi	Ol	Ne	Tu	Un	Sp	Ch	Ep	Tr	Ot	TOTAL
G12-01	42	5/03/67	No sample		--		--	--	--		--	--	--			--	--
G12-01	42	7/28/67	x	x	--		x	x	x		--	x	x			--	x
G12-01	40	10/18/67	x	x	x		x	x	x		x	x	x			x	x
G12-01	41	1/12/68			x		x	x	x			x	x				x
G18-01	73	5/01/67						196	540			349	87				1172
G18-01	74	7/28/67						44	131			109	5				289
G18-01	72	10/19/67						163	234			54	98				549
G18-01	73	1/13/68						1635	365			245	76				2321
H20-01	79	5/01/67						692	289			115	109			27	1232
H20-01	81	7/28/67						507	163			245	11				926
H20-01	78	10/19/67						403	71			114					588
H20-01																	
I23-01	80	5/01/67	--	22				349	273			360	16			11	5031
I23-01	82	7/29/67	--	54				153	817			120					1144
I23-01	80	10/19/67	11	49				305	49			512					926
I23-01																	
J25-01	77	5/01/67		71	--			398	98			191	27			--	785
J25-01	80	7/29/67		--	981			5559	234			229	11			5	7019
J25-01	78	10/20/67		11				305	49			125	5				495
J25-01																	
K28-01	75	4/30/67		207	--			839	158			93	65				1362
K28-01	76	7/29/67		180	5			463	142			872	5				1667
K28-01	74	10/20/67			10			583	44			49					686
K28-01																	

TABLE 12 (continued)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE BENTHIC MACROINVERTEBRATES

STA. NO.	D	DATE	Am	Is	Pr	Pu	Hi	Ol	Ne	Tu	Un	Sp	Ch	Ep	Tr	Ot	TOTAL
L30-01	72	4/30/67		109	38		109	1384	768			845	196			6	3455
L30-01	74	7/29/67		60	49		120	1308	349			191	71				2148
L30-01	72	10/20/67		240	5		11	1488	589			474					2807
L30-01																	
L33-01	70	4/30/67	16	174	6		33	567	360			153	180			33	1525
L33-01	71	7/29/67	x	x	x		x	x	x			x	x			x	
L33-01	68	10/22/67		365			38	3036	311			518	142				4410
L33-01																	
L36-01	70	4/30/67	x	x			--	x	--				x		--	--	x
L36-01	69	7/29/67	x	--			x	x	--				--		x	x	x
L36-01	70	10/22/67		x				x	x				x				x
L36-01																	
M38-01	74	4/30/67	1433	--	49	6		262	741			333	131		--		2955
M38-01	74	7/30/67	3554	16	--	5		1237	381			--	5		5		5203
M38-01	63	10/22/67	676	27	5			632	11			807	76		5		2239
M38-01																	
M41-01	116	4/30/67	4676	--				242	365			71	414				5768
M41-01	114	7/30/67	4502	11				2365	1090			240	196				8404
M41-01	116	10/22/67	3526	5				1019	316			109					4975
M41-01																	
M43-01	144	4/30/67	845					278	120			11	6				1260
M43-01	140	7/30/67	1112					779	185			--	11				2087
M43-01	140	10/22/67	698					1401	371			27	5				2502
M43-01																	

TABLE 12 (concluded)

CLEVELAND PROGRAM OFFICE
LAKE ERIE ROUTINE SURVEILLANCE
MID-LAKE BENTHIC MACROINVERTEBRATES

STA, No.	D	DATE	Am	Is	Pr	Pu	Hi	Ol	Ne	Tu	Un	Sp	Ch	Ep	Tr	Ot	TOTAL
N45-01	162	4/29/67	1183					480	153			11	76				1903
N45-01	164	7/30/67	774					365	98			16	16				1269
N45-01	158	10/23/67	543					2376	49			11					2979
N45-01																	
047-01	159	4/29/67	--	--				2998				--	--				2998
047-01	178	7/30/67	185	11				1537				--	--				1733
047-01	182	10/23/67		16				2572				11	11				2610
047-01																	
P49-01	98	4/29/67	8993	229				185	11			109	818				10345
P49-01	101	7/30/67	866	196				1428				147	33				2670
P49-01	96	10/23/67	670	44				861				125	5				1705
P49-01																	
Q51-01	74	4/29/67	16	224	--		33	398	327			104	1417			6	2525
Q51-01	76	7/30/67	147	103	5		27	218	--			196	550				2254
Q51-01	73	10/23/67	65	583			16	1068	49			243					2015
Q51-01																	
R53-01	64	4/29/67	65	16	121	12	44	578	202			240	736				2014
R53-01	64	7/30/67	60	38	11		11	1128	360			218	283				2109
R53-01	62.5	10/23/67	22		5		125	2720	158			98	480				3608
R53-01																	
S55-01	42	4/29/67	6		--	11	--	632	65			251	278				1245
S55-01		7/30/67	--		--	--	--	--	--			--	--				--
S55-01	42	10/23/67	93		5	22	33	1629	87			234	899				3002

TABLE 13

LAKE ERIE WATER MICROBIOLOGY
WINTER (68) CRUISE
(Cleveland Program Office Data)

Sampling Point		Date	Total Coliforms per 100 ml water sample	Standard Plate Count per ml water sample at 20°C	Standard Plate Count per ml water sample at 35°C
E2-1	Top	1/9/68	380	2,000	1,200
E2-1	Bottom		1,240	2,500	2,800
F3-1	Top	1/9/68	700	1,100	470
F3-1	Bottom		350	1,600	270
F3-2	Top	1/9/68	20	1,000	350
F3-2	Bottom		33	1,200	220
G4-1	Top	1/9/68	30	2,600	360
G4-1	Bottom		110	2,000	480
E5-1	Top	1/10/68	<1	290	75
E5-1	Bottom		11	1,300	54
G6-1	Top	1/10/68	60	2,000	280
G6-1	Bottom		1,350	2,100	420
G7-1	Top	1/10/68	450	2,200	360
G7-1	Bottom		97	2,800	200
G9-1	Top	1/11/68	120	900	480
G9-1	Bottom		140	870	320
G10-1	Top	1/11/68	38	130	140
G10-1	Bottom		4	300	180
G12-1	Top	1/12/68	4	29	1
G12-1	Bottom		2	48	6
D13-1	Top	1/12/68	<1	35	3
D13-1	Bottom		2	140	31
F16-1	Top	1/13/68	<1	31	7
F16-1	Bottom		<1	43	2
G18-1	Top	1/13/68	<1	16	3
G18-1	Bottom		<1	3	7